

Web Based Industrial Training Management Information System



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Web Based Industrial Training Management Information System

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Dissertation submitted to the Faculty of Information Technology, University of Moratuwa, Sri Lanka for the partial fulfillment of the requirement of the Degree of M.Sc in Information Technology

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Declaration

I declare that this dissertation does not incorporate, without acknowledgement, any material previously submitted for a Degree or a Diploma in any University to the best of my knowledge and belief, it does not contain any material previously published or written by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available photocopying and for interlibrary, and for the title and summary to be made available to outside organization.

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ABSTRACT

The Industrial Training Division of the Faculty of Engineering is an independent service unit functioning under the Director, Industrial Training. It is mandatory that all undergraduates after completion of their Level 3 examinations also undergo 24 weeks of industrial Training (Module No. 3990) and obtain 6 Non-GPA credits for the award of a B.Sc. (Honours) Degree from the Faculty of Engineering. All undergraduates of the Faculty of Engineering are offered industrial training at either a government Institution or a private company in Sri Lanka.

They currently rely on traditional manual system to handle their industrial training management activities. The traditional manual system is not efficient enough to cater to the including demand and does not support for providing up to date instruction to the university management. Hence it is suggested to apply a web base management information system for the industrial training division to overcome these problems. Even though there are various commercial products available in the market; these products do not satisfy adequate industrial training division requirement. This dissertation describes the development of a computerized web base management information system for the industrial training division.


Object oriented technologies were used for analysis design for the proposed system. PHP, HTML with CSS and MYSQL database technologies were used for implementation.

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ABBREVIATION

1. CMSs - Course Management Systems
2. ER - Entity Relationship
3. LMSs - Learning Management Systems
4. UML - Unified Modeling Language
5. ITD - Industrial Training Division
6. MISITD - Management Information System for Industrial Training
Division
7. CLMS - Course Learning Management System



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Introduction

1.1 Preamble

An Industrial Training may environment of the organization is not flexible enough to cater for the frequent of decision and policies of organization. Industrial Training Management policies depend on various internal and external factors such as University Grant Commission policy decision, government policy decision, decision of university council and faculty.

All undergraduates of the Faculty of Engineering are offered industrial training at either a Government Institution or a Private Company in Sri Lanka. In special situations students could also option for training in Institutions overseas, but with prior approval of the Department concerned and the Director / Industrial Training. Hence a Software System to manage this environment has become an essential requirement. This System should be flexible enough to accommodate these changes.

1.2 Existing System

The Industrial Training Division (ITD) of the Faculty of Engineering relies on a conventional manual documentation system for managing its core activities such as training, consulting, and documentation with the expansion of training activity of ITD, it was found that the efficiency of the traditional system is not able to cope with the demand, as the need for industrial training each year with new training requirements enforced on the demand on new Undergraduates of B.Sc. Engineering Degree such as B.Sc. (Transport & Logistics Management) courses is rapidly increasing. Further industrial training division's industrial training activities also changing environment frequently. Thought the existing manual system is adoptable to the changing environment of the ITD, one of the significant draw backs in the system is its inability to generate up to date training statics necessary for management decision making. Additionally, the existing manual system does not facilitate tracking participant undergraduate's details, training employers and their performance etc.

1.3 Requirement New System

The many weakness of the existing manual system includes inefficient training processing activities, difficult of draw backs tracking industrial training details and participant undergraduate's details, delay in application submission, delay in communication between training employers for specified field and the administrative staff in industrial training division, difficulty finding lists of registered training employers for specified field and training places, the lack of reliability of on training statistic and other data provided to managing etc. hence Industrial Training Division require a may efficient computerized Management Information System for Industrial Training Division (MISITD) to overcome the draw backs of the existing manual system. The university management therefore experts to computerize the following task for improving the operations efficiency of the industrial training division.

- Provide web interface for on line
- Register undergraduates of B.Sc. student's on training module
- Prepare the trainers and assign training employers places
- Maintain a registry of qualified training employers places with the contact details
- Prepare the industrial training certificates
- Prepare the industrial training statics
- Record undergraduates of B.Sc. student's information
- Prepare the selection letters to inform participant student to attend from training employers places

1.4 Problem Statement

The existing manual system is unable to handle the increasing demand for industrial training activities ran by the industrial training division and processing of information and industrial training statistics for managerial decision-making.

1.5 Solution

To develop an efficient and effective web-based Management Information System for Industrial Training Division (MISITD), as a reliable solution for the problem mentioned in paragraph 1.4.

1.6 Aim and Objective

Aim of the propose system is to overcome the system inefficiency to handle increasing demand for training and prove up-to-date training statics to the management. The following are the major objective, which are to be achieved through this project.

- ✓ To facilitate effective managerial decision by, Generating up to date training statics, Identified participant student training history and behavior, Viewing participant student and resource person detailed
- ✓ To increase efficiency of handling the growing workloads by, Accessing central location to creating student, assigning resource training places and selecting student.
- ✓ Speeding up to date entry while awarding unnecessary redundancies
- ✓ To maintain training standard and quality for preventing malpractices by, Monitoring ongoing trainers, Preparing training certificates, Preparing participant selection letters.
- ✓ To prevent delays by providing additional digital channel for Student to register for online and Sending list of student for resource person via email
- ✓ To improve the reliability and confidentially by controlling system access through a security system for access level

1.7 Stakeholders of the System

Stakeholders of the system director, senior lectures, consultants, program assistances, participants, and students are the major stakeholders of the system.

1.8 Summary

The Industrial Training Division of the Faculty of Engineering is an independent service unit functioning under the Director, Industrial Training. At present, all these Training are managed by a paper based system. This system has several drawbacks. In this project I expect to develop a user – friendly, automated on line Training Management System to overcome the existing drawbacks using present web technologies. The next chapter explains literature review and description of domain activities.

Literature Review

2.1 Description of a domain activities

Industrial Training Division Management activities commence after receiving application from the undergraduate registrar. First activity is sorting and grouping of application according to the student No., Student Name, Faculty, Department, Course files are created from stored application.

After selecting or scheduling of category student, suitable participant are selected from the relevant applications. Staff coordinator is the person responsible for these activities.

Based on the section the ITD staff sends invitation to the training places or else NAITA, to conduct relevant selected student and sent selection letters to the participant information them to attend proper training places.

According to the schedule or especial from coordinator, registrar, IDT Staff will arranged examination of the industrial training module. The student sent weekly report, monthly report, NAITA diary and final training report also record assignment given for a mark. The data in used for processing of final mark result.

At the end of each trainee, evolution is done through individual undergraduate course evolution from collected participant. A course evolution system is used to analyses responses and prepares report. According to the trainee's attendance get the via training places and final training report result of examination and based on the assignment (depend on applicable rules), ITD staff or relevant person responsible preparation participant training certificates. The complete set of description of domain activities is given in appendix A.

2.2 Literature review

In the global software industry market, there are two products categories in the area, namely course management system (CMSs) and learning management system (LMSs). On the surface, the CMSs and LMSs are seemed similar. Both allow enrolling participants' on training courses, communication with learners and trainees,

lack performance and launching learning materials. However, in depth those were designed for every different proposal [1].

2.2.1 Course Management Systems (CMSs)

Course management system is online system that was original designed to support classroom learning in academic sitting, such as university and high school level.

2.2.2 List of tasks

1. Most CMSs provide facilities to place course materials such as course syllabus, course schedules and course materials linked to specific lessons, copies of reading materials and Power Point slides from lectures etc.
2. These systems enable instructor to give quizzes, tests online, and an online grade book, etc. for tracking student progress through assessment.
3. Instructors and students can discuss readings and continue classes, discussions between formal class sessions using the discussion board. Further, it provides communication tools, which let instructors to send announcements to classes and communicate individually with students.
4. Students can store class materials in a safe place either a presentation to give later in class or backing up class assignments in a same place.
5. System provide course statistics on the use of the course site, including who used the course site and when.
6. CMSs enable instructors /coordinators to easily create a course web site by following a template and uploading existing documents in Power Point. Word, Excel, Acrobat and other popular formats without converting them to a web format (Like HTML) they require few specialized skills.
7. Class also have proven popular in managing asynchronous academic distance courses, too, because of their ability manage discussions. When using CMSs to manage a distance course, instructors post a core lesson or a master strip that guide students through readings, discussions, and learning activities, instead of merely posting reading and Power Point slides for each lesson.
8. Instructors use the discussion board to manage the course discussions, which are usually more expensive than those used in classroom courses.

However, CMSs pose a few challenges for their users. In exchange for the ease of use most CMSs provide instructors with a limited flexibility in designing courses. CMSs typically come with standard sessions that instructors must provide, and the section names are not easily altered [2].

CMSs have limited capability to provide interactive e-learning. Although they let instructors test students online. The test must usually conform to templates and e-learning primarily consist of reading transcripts. To add more imaginative and interactive e-learning via authoring tools like Flash and Dream weaver, instructors must link to separately created materials. That is, the lesson cannot be created and uploaded in the CMS. The material must be created with different tools and stored elsewhere [2].

Since many universities use other systems to enroll students and manage payments. But most CMSs cannot handle these tasks. Universities and other academic institutions need a meaning of making sure that graduating students have paid their library fine etc., before awarding course certificates. But CMS systems are most widely used in universities to manage enrollments and grades, and link to other university records systems such as administration systems [2].



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2.2.3 Learning Management Systems (LMSs)

Learning Management Systems refer to software that primarily acts as an electronic registered by electronically performing various enrollment and related task. LMSs were originally design for work place learning environment, and specially perform some or all of the following tasks.

- ❖ Track participation(classroom attendance, sign-on and sign-off, of on line courses)
- ❖ Track of completion(including final scores and grades)
- ❖ Testing
- ❖ Follow up discussions with participants.
- ❖ Aggregated reports, such as the number of people registered for the particular course.
- ❖ Transfer of information to other system, such as human resources information systems.

- ❖ Process charges for courses, such as tuition payments and transfer payments.
- ❖ Course catalogue
- ❖ Skills managements.

From participant perfectives, LMSs provides a central portal for accessing learners activities. It provides a list of courses available, and lets learner enroll in courses. If learners must complete prerequisite course, the system checking is capable of tracking them. After learner enrolls in a course, the system can automatically generate an enrollment confirmation letter and a reminder about the class. After class the system can be used to test knowledge, record of course completion, and send the information to the learner's permanent employment record, as well as send follow up Correspondence to the learner. For an e-learning course, the system can launch the course, track student progress, record completions, and send information to the learner's permanent employment record [4].

For administrators, LMSs can be used to manage both classroom and e-learning. For e-learning, the system starts the course after the learner registers in the course. For classroom courses, the LMSs can provide a variety of resources, including schedules for individual classrooms (that is, facilities tracking capabilities) and class lists for instructors. LMSs can also be used to record and assess training satisfaction; in addition, LMSs can generate a number of reports, from the number of students enrolling in a particular course to aggregate records of student performance in particular courses [4].

Although in increasingly wide use. LMSs pose a number of challenges for their usurers. Following are some of challenges [4].

1. Cost. Analysis in the online learning industry comments that learning management systems are often the most expensive learning investment made by organizations. Costs can be easily range from \$5000.000 to several million dollars.
2. Evolving technology. The technology used for LMSs has changed extensively in the past six years. Some moved from inflexible to more flexible Platforms. other an added many of the features of a learning content management system, which is used to manage electronic source files for courses, so the material can be easily used in other courses

3. Challenges in customization. Like clothing for most hard to fit people, the unique quirks of a particular organizational environment require that training organizations manage their operations in a particular way and most LMSs are designed to manage operations in a different way. Although LMSs can be customized (and this has become easier with time) many cannot handle every unique need of a training organization. Organizations may have to do commission custom programming to achieve their goals.
4. Interoperability with other learning material. Because LMSs are supposed to provide a one –stop shop to learners as well as track all learning activities., these systems should be easily provide links to all on line learning Programms and easily share tracking information , test results , and similar material with courses Although e-learning standards requires a fair amounts of work by the technical staff.
5. LMSs are primary designed to manage e-learning. However that can be used to manage all of a training organization’s learning programs, including traditional class room training.

Hence those two systems (CMSs and LMSs) were initially designed for different environments. CMSs is designed for academic environments and LMSs for work place working environments.

CMSs are ideal for managing classroom courses in universities and other academic environments. The communication capabilities they offer make them ideal for managing long-term, academic distance courses taught in an asynchronous manner, and for which students are expected to do extensive readings, CMSs cannot be used to create them their includes asynchronous e-learning Modules with animated (Flash) sequences and narrated lectures that need to be recorded in other formats [4].

In additions, although they provide record keeping features, CMSs were not designed to record and report course enrollments, final results, payment for courses and similar administrative functions. Later version of commercial CMSs now provide some or all of these features, because most universities have long term investments in other systems to handle such tasks, CMSs are not likely to be adopted to handle administrative tasks [4].

Unlike CMSs, LMSs are ideal for e-learning programs, which can be created in order to tools. Similarly, LMSs can handle a broader range of registration and related tasks than CMSs, because they were designed to do so.

A client once asked why universities and other academic institutions couldn't use LMSs. The answer: because education and training are different type of learning activities, the system that support they are essentially different. As education is intended to build long-term knowledge, the CMSs that support it are designed to support to long-term academic classroom classes. In contrast, as training is intended to build knowledge for immediate application, so LMSs are designed to support a large number of short training events [4].

In other words, although e-learning is used in both work place and academic environments, the type of e-learnings, the means of assessing it and types of records kept, with it significantly differ among two environments. As a result, different system has been developed to meet the needs of these environments [4].

2.2.4 Typical CMSs and LMSs Features

Typical commercial CMSs and LMSs features can be summarized as follows Grade reporting tool to allow students to view grades [5].

1. Course website backup, download, and upload facilities.
2. Student account administration tools.
3. Web based file management.
4. Course amusements and calendar administrative tools.
5. Student evaluations.
6. Group work areas for collaborative web page publishing.
7. Course content annotation facility
8. Individual grade and progress status reports.
9. Course website creation, duplication and deletion.
10. Course websites statistic such as number of students enrolled in a course, file space used by a website.
11. Student accounts administration
12. Bach student account initialization and deletion.

2.2.5 Commercial Products

A commercial (also known as proprietary or enterprise) CMSs fundamentally is the same as an open source CMSs, except that a company owns the software and you do not have access to the code.

However, without the support of a community, customizations cost extra and system functionality updates are done at the discretion of the company. Feature requests are usually not allowed and bugs can take a while to fix, depending on the support team in place at that company. Many commercial systems are expensive and can have annual fees; you pay for the peace of mind of having support and stability (for as long as the company is around that is!) [7].

2.2.6 Commercial CMSs and LMSs Products

There are now dozens of different types of Learning Management Systems, or LMSs and Course Management Systems or CMSs, used by organizations to manage e-learning and deliver course materials to employees. And while these systems typically share a common purpose to manage and administer a curriculum to a large and sometimes scattered workforce the individual features of each of these platforms can vary pretty widely.

New products appear all the time and existing products may be improved profoundly with the new version. Most of these systems were designed for organization, which run busy training centre.

2.2.7 Type of Commercial LMSs and CMSs Products

The logo for Apptual, featuring the word "Apptual" in a stylized, italicized font.

Apptual

Apptual is a white label cloud based LMS that lets educators design social, action based learning experiences.



Brain X - Learning Management System

With Brain X learning management systems (LMS), online sales training goes beyond teaching sales negotiation and product knowledge. BrainX will teach your sales force to build rapport with your clientele and adapt to their

behavioral style to build trust and an ongoing relationship.

Course Toolkit LMS



Course Toolkit is a Learning Content Management System which enables tutors to create and manage educational course content. Create and organize HTML documents, tests, quizzes, collaborative wikis and multimedia content, invite students and track studying process with in-built reporting tools.



NEO LMS

NEO is a simple, powerful LMS for schools and universities that makes it easy to deliver online education.



EduWave

EduWave is a multilingual solution that caters to virtually every aspect of the educational cycle.

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LearnCore



LearnCore is a learning management system built to provide a user-friendly experience for both administrators and learners. Enhance the training content your organization already has by deploying it on the interactive LearnCore platform.

OU Campus



OU Campus is a web content management system developed by OmniUpdate. OU Campus can be accessed via the cloud or deployed on-site. Proprietary software.

JoomlaLMS



JoomlaLMS is a fully functional learning management system for Joomla! that contains a variety of available features both for teachers & learners including innovative training / testing options, advanced conferencing

applications and much more.

Magnolia CMS



Magnolia is an open Java CMS that delivers smartphone simplicity on an enterprise-scale. The mobile-inspired HTML5 user interface works through customisable, task-focused Apps, a notification stream called the Pulse, and a system of Favorites for quickly accessing the workspace.

Sitefinity



Sitefinity by Telerik is an ASP.NET web content management platform engineered to make managing your website a more positive, empowering and usable experience.

DNN Evoq Content



DNN Evoq™ Content, formerly known as DotNetNuke® Professional Edition, is a business solution that helps bring your website to life with captivating content and engaging interactions. Users can add and edit content through a standard browser with no IT support.

Squarespace



Squarespace is a popular website builder. With an extremely easy to use interface that's sleek and "gets out of your way", they are definitely a top contender. For those on the fence, they offer a free trial with no credit card required.



Sitecore

Sitecore is an award winning enterprise content management system.

2.2.8 Open Source Products

The term "open source" refers to something that can be modified because its design is publicly accessible.

The open source, which means the software, is free and you have access to the source code (which you can alter). These systems survive because of community involvement – volunteers who check for bugs, make security updates and add new features and functionality. Because of this, customizations happen more quickly based on the needs of the public. There is also a large base of people to fix bugs, add functionality, test and optimize the system through all different uses and backgrounds [7].

2.2.9 Open Source CMS and LMS Products

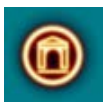
An open source (LMSs and CMSs) is a software application for the administration, documentation, tracking, reporting and delivery of e-learning education courses or training programs.

CMSs range from systems for managing training and educational records to software for distributing online or blended/hybrid college courses over the Internet with features for online collaboration. Colleges and universities use CMSs to deliver online courses and augment on-campus courses. Corporate, training departments use LMSs to deliver online training, as well as to automate record-keeping and employee registration [8].



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2.2.10 Open Source LMS and CMS Products



Bodington - Virtual Learning Environment/Learning Management System.



Docebo - In use in corporate and higher education settings. Offers support for a number of different learning models and is compatible with SCORM 1.2 and 2004. It offers interfaces to external systems such as video conferencing and HR systems.

eFront - The base install is quite minimalist, but this is easily extended with modules available from the site. Commercial versions with additional features are also available.

Dokeos - A very well featured LMS that also offers content authoring and video conferencing tools. Supports converting Office

documents into Learning Paths. Offers user synchronization with HR management systems such as Oracle and SAP.

Claroline - Aimed more at the educational than corporate arena, this system is based around specific pedagogical principles (as is Moodle). Supports SCORM content as well as a built in Wiki and other online content tools.

ATutor - Actually an LCMS, ATutor also offers tools for the management of learning. The “A” stands for Accessible and it has excellent support for key accessibility standards as well as support for SCORM, IMS etc.

ILIAS - Provides testing and assessment tools as well as collaboration tools such as chat and forums, and distribution technologies like RSS and podcasts.

.LRN - Originally developed at MIT, .LRN claims to be the most widely adopted Enterprise Class open source LMS solution. Marketed specifically as a business solution, and claims a diverse customer base that ranges from Merrill Lynch to Queens Park Rangers football club. Full-featured application for rapidly developing web-based learning communities



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Moodle - Perhaps the most popular open source course management system. Moodle is built around a constructivist framework and is optimized for facilitated online learning.



OLAT - A well featured system in its tenth year of development. Recently the winner of the “IMS Learning Impact ‘Leadership Award’ 2009 for best open source learning platform”.



Sakai - Aimed at Universities, this project has a clear roadmap and has seen considerable development in the last few years. Backed by the Sakai Foundation which manages relationships with educational and commercial supporters.



2.2.11 Security

Some system support Secure Socket Layer. In general, all system will support the Basic authentication. A portal ticket system (Login allows at the central portal, which sends an encrypted ticket to the LMS) which use standard MIT Kerberos 5 for authentication of LMSs [5]

2.3 ITD requirements and the Features of commercial products.

In contrast to the available commercial and open source products their features, the proposed ITD CMS shows more similarities for learning management system , some of the features available in commercial products are not required in the ITD CMS and some other features required in the proposed CMS are not available in commercial products. Most of the similar features available in commercial products are not up to the standards expected by industrial training division. A comparative analysis undertaken between ITD CMS and common features of commercial products given in table 1.

Features	ITD CMS	Commercial products
User accounts creation and administration	Yes	Yes
Activity reports	No	Yes
Assign report person	Yes	Yes
Invite resource person to conduct lectures	Yes	No
Prepare course time tables in ITD format	Yes	No
Course content annotation facility	No	Yes
Course creation and deletion	Yes	Yes
Viewing training statistics such as no of students enrolled in a training module	Yes	Yes
Data manipulating using SQL commands (Administrators only.)	Yes	Yes
Enroll students	Yes	Yes
Generating student calling letters	Yes	No
File up-load facility (for student) through Web.	No	Yes
Grade reporting tool (to allow students to view grades)	No	Yes

Group work areas	No	Yes
Student assessment information recording	Yes	Yes
Security	Yes	Yes
Students accounts administrations	Yes	Yes
Students evaluation	Yes	Yes
Web based file access facilities for students	No	Yes
Certificate processing facility	Yes	No
Automated software installation	Yes	Yes

Table 1: A comparison of ITD CMS with commercial products.

As the data reveals, it is difficult to apply commercial products for ITD course management activities without high level customization.

2.4 Summary

The industrial training division environments require managing a trainee operation in particular way and most CMSs and LMSs are designed to manage operations in different way. Although both commercial and open source product can be customized, it cannot hardly ever unit need of ITD. Most suitable commercial and open source product category of ITD requirement is LMS, which is available in open source with GNU license in the real world computer market. But the problem is very hardly cannot be customized in the standard version.

The next chapter explains analysis of the problem domain and alternative system designed to overcome the existing system difficulties.

Analysis and Specification

3.1 Introduction

The existing manual system was studied by interviewing stakeholders and studying document such as industrial training module Nos.3992 / 3993 (Non-GPA modules for 6 credits) and other related industrial training division document.

According to the results of system study 1.2, five subsystems were identified in the existing traditional manual training system based on the duty allocation of the industrial training division. The ITD is responsible for relevant operation (See Figure 1) from this system, user requirement were identified through interviewing by stakeholders, studying document, prototyping and using domain knowledge. Collected requirement were classified and resolved the complicit following are the identify user requirement.

3.2 User Requirement

User shall be able to,

- 1) Short list undergraduate applications on student no. and name.
- 2) Prepare the training student category list and send the letter to the NAITA.
- 3) Prepare the selection list and letters to inform to the NAITA and participant attend training places.
- 4) Record participant assessment information such by report.
- 5) Prepare the training certificate.
- 6) Prepare the training statistics.
- 7) Prepare the industrial training module exam results.

User requirement mentioned above were checked and confirmed by the ITD Director, consultants and other stakeholders.

After analysis of identified user requirement, software requirement specification (SRS) was prepared. Use cases were used to describe all of the interaction that the user will have with the system. See appendices A, B, C, D, E, F and G for detailed information documents.

3.3 System Architecture

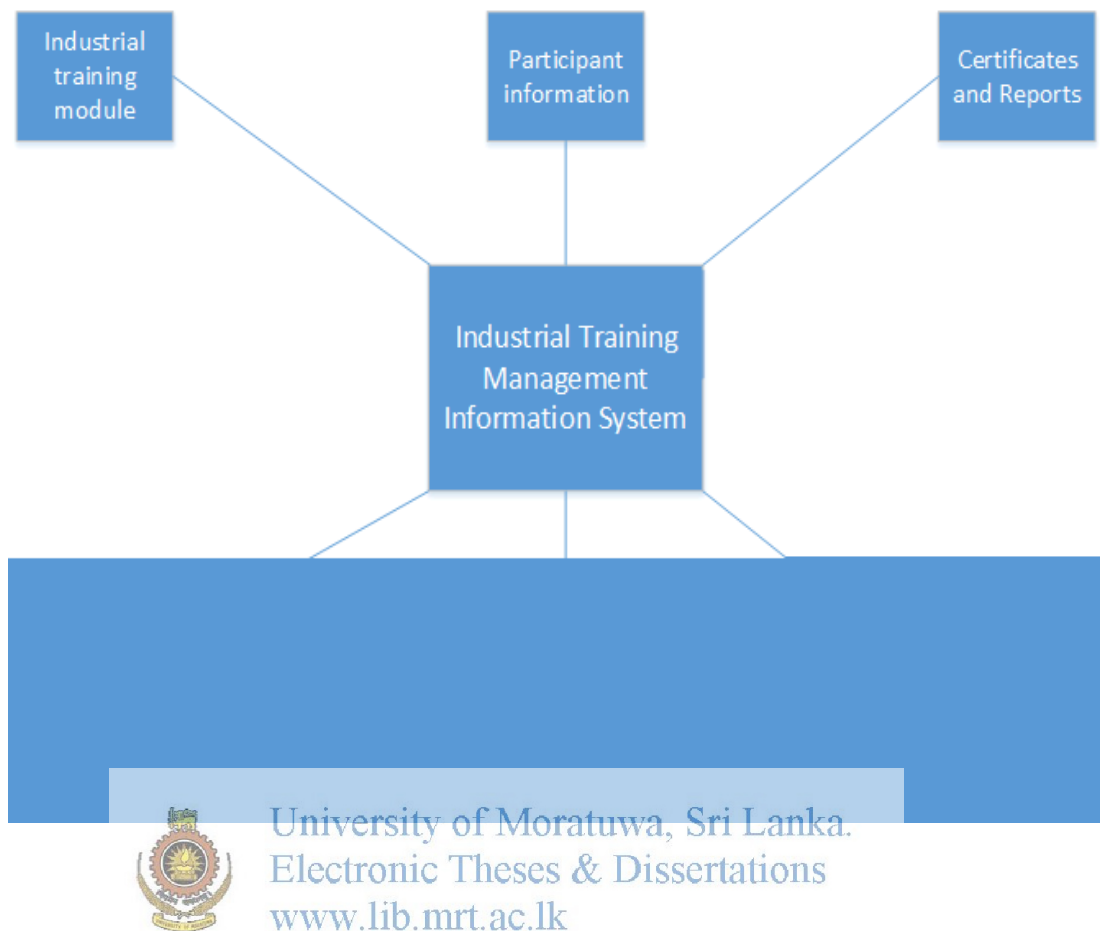


Figure 2: Context of the existing industrial training management system

3.4 System Requirement Specification

3.4.1 Functional Requirement

- ✓ System shall control user accessibility over suitable security system.
- ✓ System shall provide proper modification facility for all entries.
- ✓ System shall generate selection letter to inform participant to participate to the relevant training places on the given date.
- ✓ Generate selection letters should be printability
- ✓ System shall provide graphical user interface for entering training details, participant details and training places.
- ✓ System should store training participant, training places, and resource employer's details in the data base.

- ✓ System shall generate email to invite training participant to attend the date of the training place.
- ✓ System shall generate training certificate and attendance certificate on given criteria.
- ✓ System should provide online web application facilities for enter the system participant via the web.
- ✓ Details of online applications should be stored directly of data base.
- ✓ System should provide facilities for user to define rules sets time to time for effect from industrial training module nos. 3992/3993.

3.4.2 Non Functional Requirement

- ✓ System should be access over any computer within the intranet system there access control should be maintained.
- ✓ System should be accessible through the web browser through internet.
- ✓ System should not a reveal system data to unauthorized person.
- ✓ System shall be capable to be work in a multi-user environment.
- ✓ System shall not allow access to unauthorized users.
- ✓ System shall offer more user friendly interfaces.
- ✓ System shall control data integrity.
- ✓ System shall keep protection defined for an at least for at 10 years period.
- ✓ System shall keep training participant details at least a 10 year period.
- ✓ Processing time should be at least must 45 second for any functionality within the internet.
- ✓ Quality manual of the organization should be followed and ISO 9000 standard should be mentioned by system

These requirements were valuated through requirement preview process. Discussions were held with main stakeholders, coordinators, some participant and other related staff members Such as consultants, former directors.

3.4 Summary

Existing system was re-engineered to eliminate redundancies and improve efficiency; go new features were added for enhanced functionalities. Various type of UML

diagrams were used to identify the processors and their activities. This next chapter explained for system model and new system design.



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Chapter 04

Design of the Proposed System and Technology adopted for the System

4.1 Introduction

In this chapter, emphasis is given to describe the system model and design of the proposed system and explain the technologies which have been used for the development of the proposed project and its suitability and viability for the system. Object orient system modeling technologies with UML notation were used for modeling and designing. All the diagram used to model the system are not describe in this section, A few sample diagram are given in the chapter to facilitate understanding the method used for modeling and design.

4.2 Model of the Existing System

Requirement elicitation was based on case-based diagram for actors were identified in the system namely coordinator, Director/Registrar, Sri Lanka participant trainers and other relevant staff, which include all stakeholders who only interact with the system for viewing report. UML activity diagram were used to describe the activities of each interaction identified by use case diagram.

Director Interacts with the system for collecting student registered application from UG division, the NAITA for conducting industrial training in the given list of trainers, sending selecting letters for participant informing them to attend training places, issuing training certificates and proper training report based on training statistics. In the case of issuing certificates ITD staff involved in issuing training certificate to the completed industrial training student.

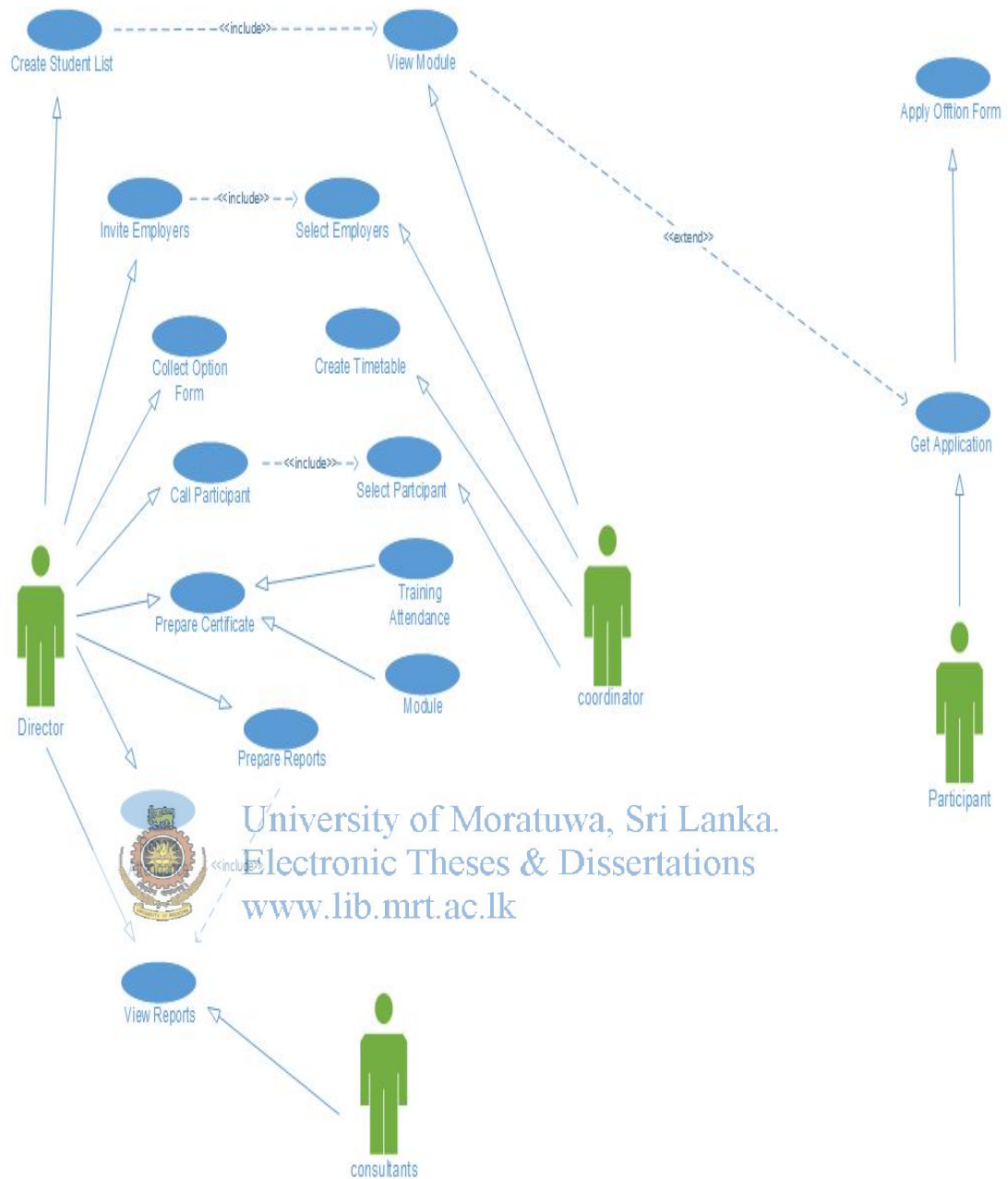


Figure 3: Explained the Director or Registrar interaction with the system

ITD user's different type of training certificate for different type of under graduate BSc degree course such as Department of TLM, MOT etc., In general training certificate issued for each and every completed trained participant who attend its relevant trainees. But training certificates are issued on achieve performance of the participant based on evaluation criteria specified in the industrial training module Nos. 3992/3993.

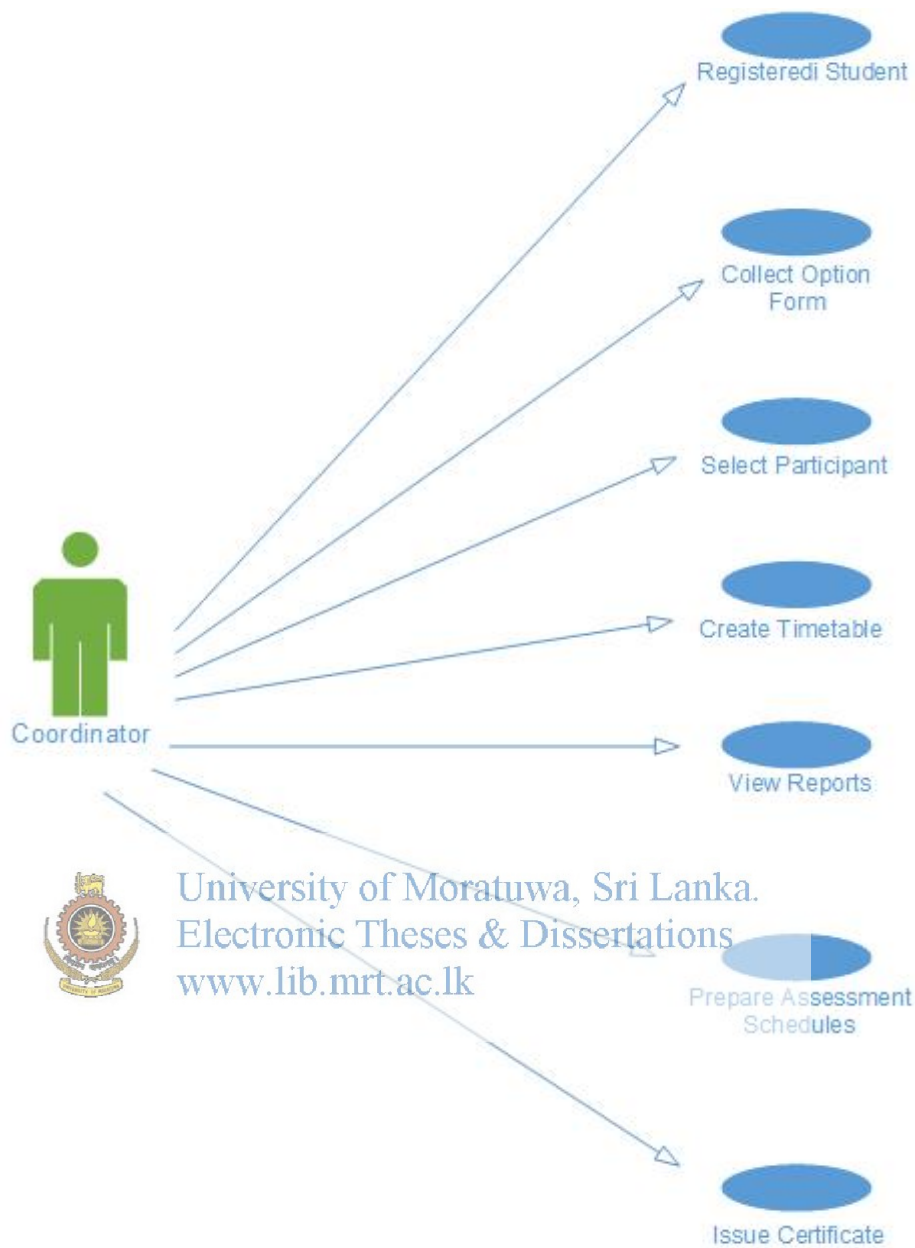


Figure 4: Explained the Coordinator or Consultant's interaction with the system

In this section, coordinator or consultants interact with the system for creating training list, creating module hand book, selecting participant after gathering registered applications by UG division. The roll of the training coordinator or consultants in the system is depicted in figure 3.

Industrial training module registered applicant or Participant interact with the system for getting training application to apply relevant training places. Other ITD staff members who interact with the system for retrieving information but they are not needed to make any changes to the system data.

UML activity diagram were used to describe the activities of each interaction identified by use case diagram. Figure 4 shows the activities involved in sending a selection letter to selected participant for informing them to attend 21 weeks from the date of commencement of training some department may extend this period to 24 weeks depending on employer requirement.

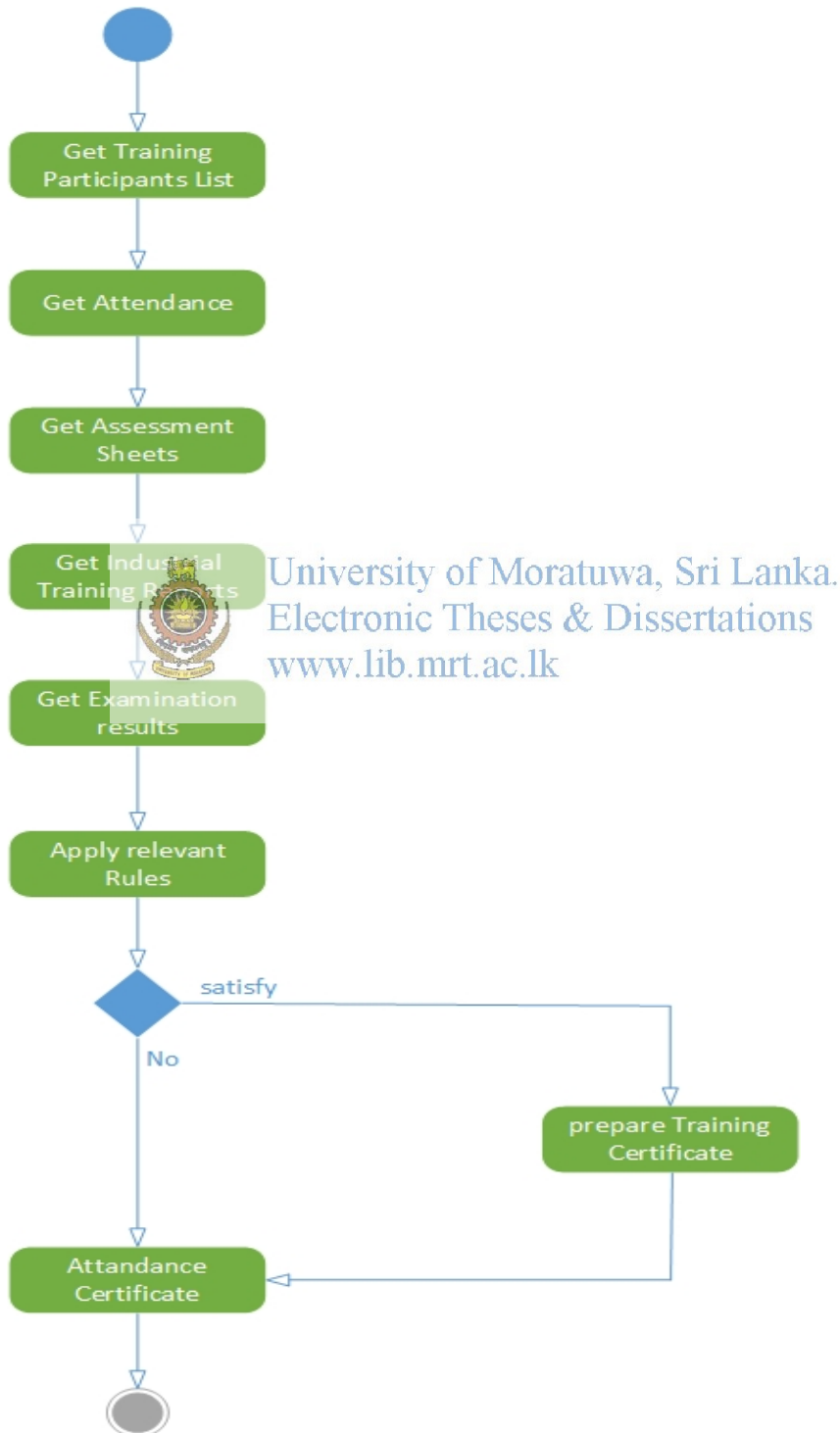


Figure 5: Explained the Coordinator or Consultant's interaction with the system

Based on the identical requirement in the analysis, this new system was design on subsystem model

4.3 Design of the Proposed System

Five actors were design in the proposed system namely industrial training module coordinator, Director/Registrar, participant, other ITD Staff and system administrator. Use case interaction of training coordinator, Director/ Registrar and other ITD staff are very similar to the existing system. Hence, these actors are not explained here.

System administrator is a new actor, He interact with the system for administration and maintenance. System administrator is responsible for creating user account, modifying existing account and maintains existing system. Administrator should assigned appropriate access level for each use according to the instruction given by the Director by the ITD [11].

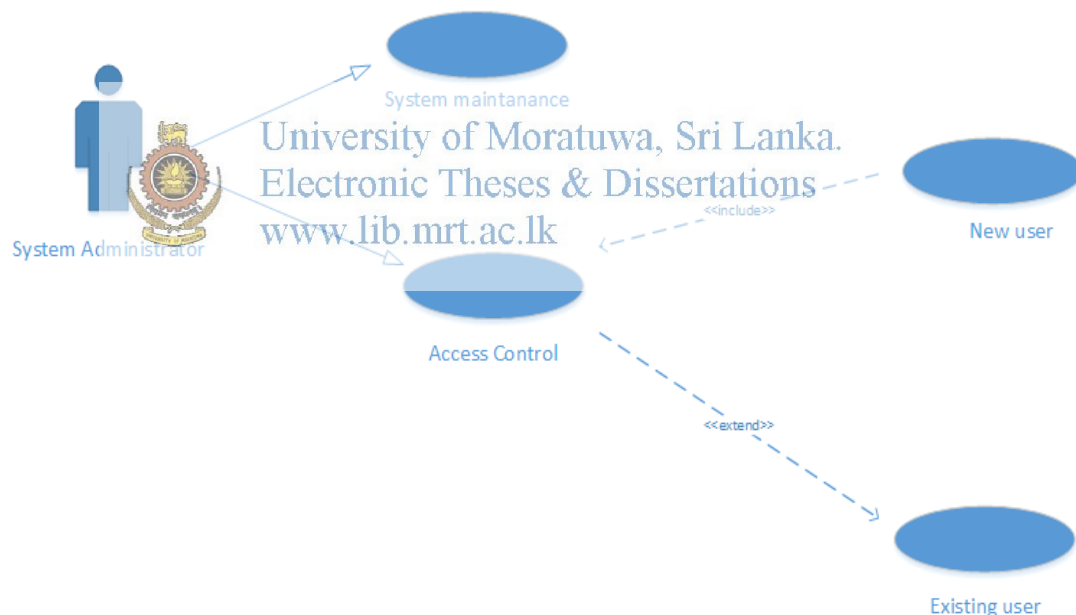


Figure 6: Explained the System Administrator interaction with the system

4.4 Subsystem Architecture

Five subsystems were designed to implement the proposed ITD CMS. Access Control Sub System, Industrial Training Participant (ITP) Sub System, Training Employers (TE) Sub System, Industrial Training Module Sub System and

Performance Systems are the sub system design in this context. Figure 6 depicts this sub system architecture.

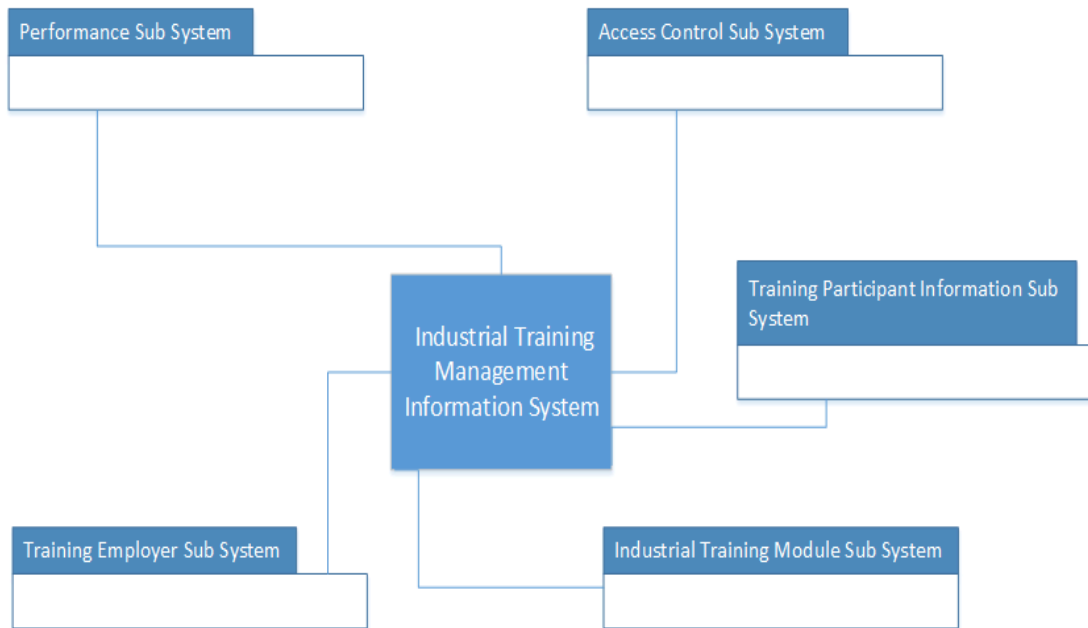


Figure 7: Context of the Sub System Architecture of an industrial training management information system



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4.4.1 Access Control Sub System

This sub system is design to control system access through a password system. This system work with the separate data based that stored needed use information. The system administration is an actor who is involve in access control and other related activities of the system.

4.4.2 Industrial Training Participant Sub System and Training Employers Sub System

These sub systems were designed to store relevant information independently from other sub system to enable handling, feeding, and editing, monitoring, managing and querying information without accessing the entire system. These systems were design to store participant trainer and specified employee resource person and training places details in a common pool to reduce redundancy. Hence it prevents repeated data entry

because the system allows updating the existing data according to the latest information.

4.4.3 Industrial Training Module Sub System

This sub system is the system that will be interacted by both the Director or Registrar and Training Coordinator. This sub system is provided training module information about the registered participant and module sending out participant selection letter, preparing certificates etc.

4.4.4 Performance Sub Systems

This sub system is used to store and handled participant performance information such as training attendance, examination results with training report results, continuous assessment report, daily diary provided by NAITA etc., Primarily certificates are generated on data taken from sub systems. This sub system is protected with additional security enforcements.



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4.5 Data base Design

The data base is design using entity relationship data model. MYSQL is used to design tool and figure 7 shows E-R diagram of the propose data base.

4.5.1 E-R Diagram

E-R diagram figure 7 shows the type of relationship between the entities. It is an essential step towards develop a database management system.

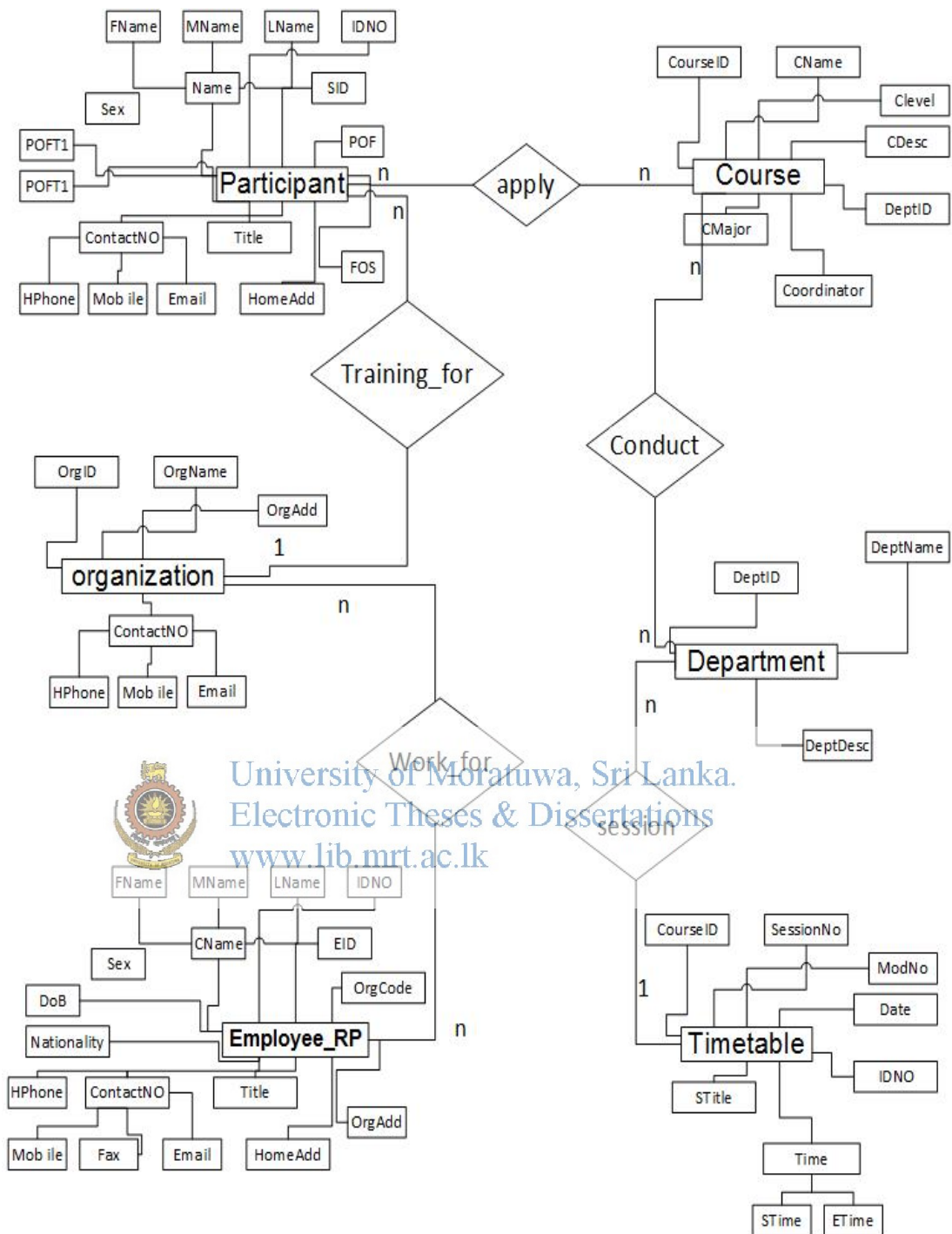


Figure 8: E-R Diagram for the MISITD

4.5.2 Abstract Data Model

The abstract data model shows the data structure and their organization in general. It does not specify certain data but it models the data types, their relationships, and their organization in a system.

The following figure shows an abstract data model of MISITD using object. If the MISITD is to be designed using RDBMS then these objects can easily be converted into tables, the attributes will be used as columns. Primary and foreign keys are also defined which can be used to related data.

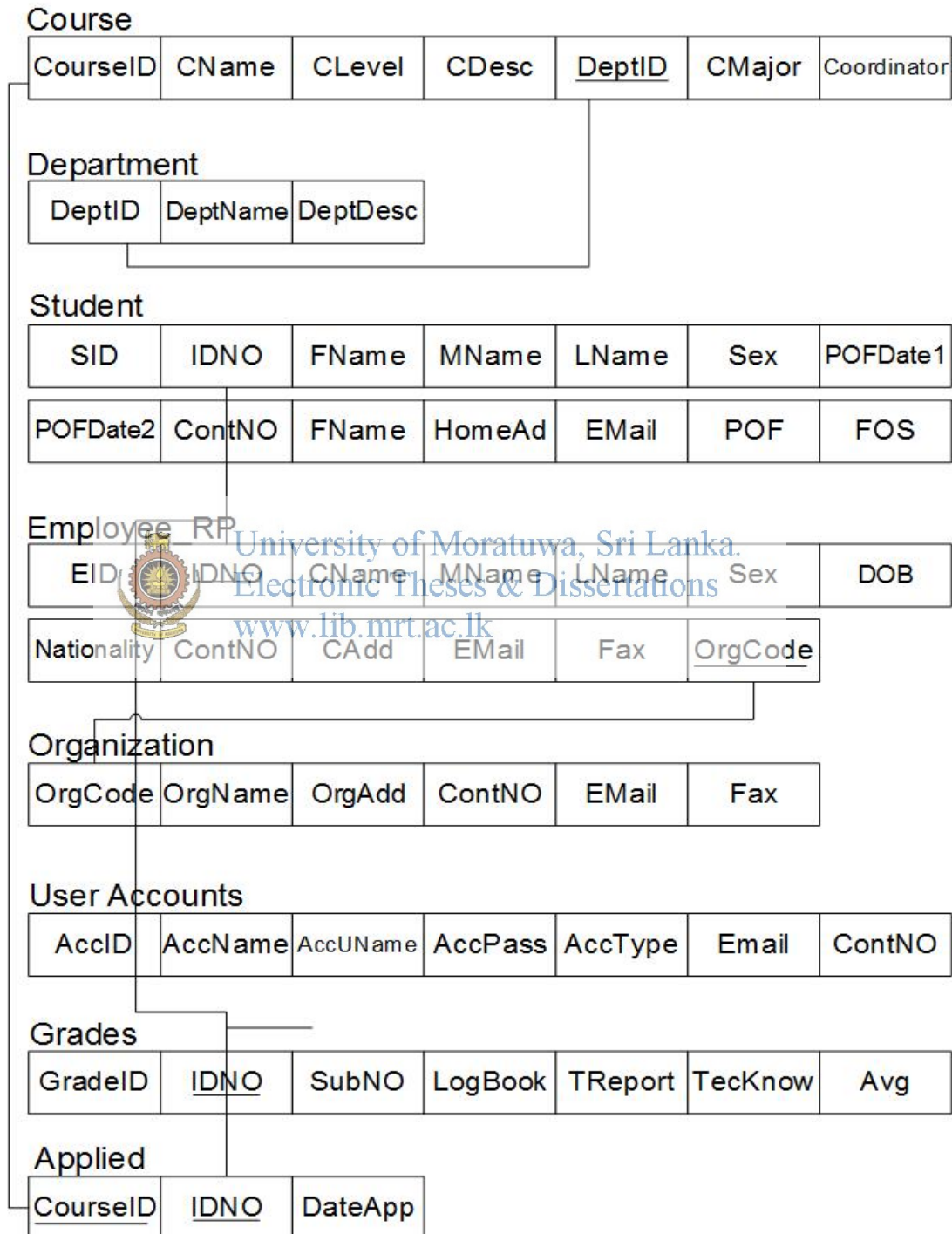


Figure 9: Abstract Data Model

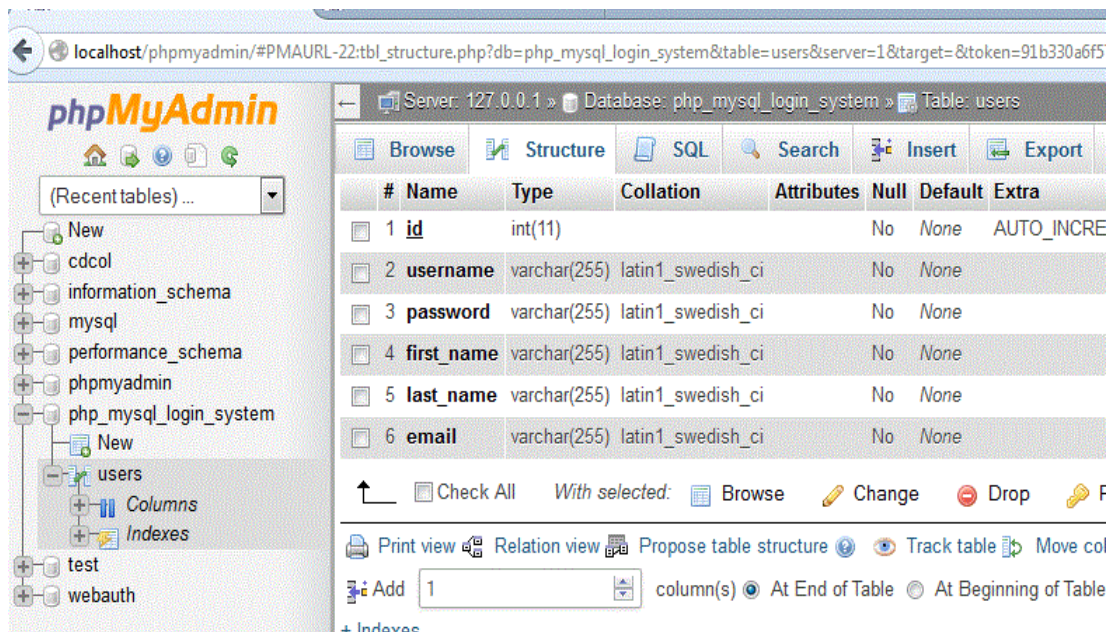
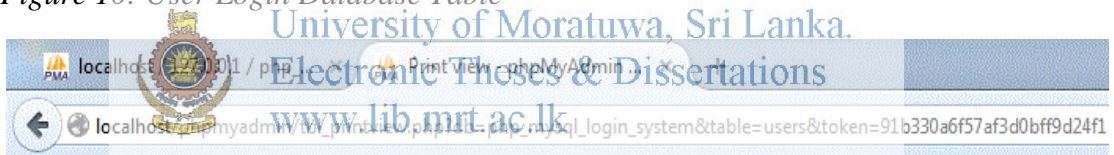


Figure 10: User Login Database Table



users

Column	Type	Null
id	int(11)	No
username	varchar(255)	No
password	varchar(255)	No
first_name	varchar(255)	No
last_name	varchar(255)	No
email	varchar(255)	No

Figure 11: User Login Attribute Table

4.6 Background of the technology used

There are several web technologies available for implementing this module such as Java, VB dot net, Perl among these technologies one prominent technologies Java Script, PHP, and HTML with CSS. Another technology is VB frame work, which

support for HTML. My SQL data base management software is applicable for the proposed system module.

Other alternative technologies are so expensive because it needs to purchase end user license to use this software under the enforcement of intellectual property law in Sri Lanka.

Among the PHP, HTML with CSS with DBMS software mentioned above, these software available in Open Source under GNU Public License is world wide software industry.

4.6.1 PHP

PHP is a widely-used general-purpose scripting language that is especially suited for Web development and can be embedded into HTML. Using PHP scripting and MySQL database enables programmers to create applications that'll run on just about any computer, regardless of operating system. PHP has thousands of programming functions to facilitate almost any task. PHP / MySQL is most often used to create dynamic web sites.



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PHP / MySQL projects include forums or communities, organizers, project management tools, calendars, shopping carts, mailing lists, and all sorts of useful applications. Source code for many open source projects is free, while advanced projects often require a registration fee for commercial use [11].

4.6.2 HTML

HTML is short for Hyper Text Markup Language and is a language used to create electronic documents, especially pages on the World Wide Web that contains connections called hyperlinks to other pages. Every web page you see on the Internet, including this one contains HTML code that helps format and show text and images in an easy to read format. Without HTML a browser would not know how to format a page and would only display plain text with no formatting that contained no links.

4.6.3 MYSQL

MYSQL is a popular choice of database for use in web applications, and is a central component of the widely used LAMP open source web application software stack. LAMP is an acronym for "Linux, Apache, MYSQL, and Perl/PHP/Python"[9].

4.6.4 LAMP Server

Short for *LINUX, APACHE, MYSQL and PHP*, an open-source Web development platform, also called a Web stack, that uses Linux as the operating system, Apache as the Web server, MYSQL as the RDBMS and PHP as the object-oriented scripting language. Perl or Python is often substituted for PHP [9].

4.7 Summary

PHP, MYSQL, HTML with CSS technologies were selected for implementation of this system. Rationalize for selecting these technologies is that there are economically viable, robust, portable, open source with GNU license and easy to manipulate with object oriented concept.. MYSQL is the database. The next chapter explains the Implementation of the system.



Implementation

5.1 Introduction

This chapter discusses the methodology of implementation with the aim of achieving the objectives declared in the project proposal. The information that is stored in the system, the way how these have been stored, together their description and relationships made on key information have also been discussed. Further, components and features of the website have also been included for easy accessing and for location of the information required.

5.2 System Architecture

This system was developed with five sub systems. Figure 13, shows the components diagram of this proposed Management Information System for Industrial Trainings Division. In addition to the five sub systems mentioned earlier, we added report, Help and on line Industrial Training Module to the Reference sub system for convenience of users. Each sub system, except reference sub system, is capable of operating independently, this providing easy maintenance according to the organizational requirement. The reference sub system communicates with other sub systems to collect relevant information.

As an example, Training Employers (TE) Sub System could be connected to the ITD intranet without connecting entire system for viewing employer's information for all relevant staff for the industrial training division. But all staff of the industrial training division is not allowed to view participant performance etc., on the Industrial Training Module Sub System is directly connectable to industrial training division web site for use of general public.



Figure 12: Components diagram of the Management Information System for Industrial Trainings Division

5.3 System Integration

Subsystem mentioned above were integrated together to form a complete system. This integration is done using the increment integration approach [12] as the subsystem is developed one at a time.



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Among the subsystems integrated, the first subsystem was Resource Person subsystem. Second subsystem connected was Participants subsystem. Course subsystem, performance subsystem, Reports subsystem, On Line Course Application subsystem. Login subsystem and Help subsystems were connected respectively. It is worthwhile to mention here that the incremental approach was more convenient to track integration errors easily. Identified errors were corrected during the integration.

A common unified interface that provides access to the functionalities of all modules was developed as the graphical user interface to the system.

5.4 Graphical User Interface (GUI)

GUI was designed to identify how these subsystems are arranged in home page. At the starting point, only active subsystem is login subsystem. After user obtained permission to access the system by verifying this identity based on the user name and

password, the system activities entire system depending on access level assignment to the relevant user.



Figure 13: diagram of the Main Home Page subsystem

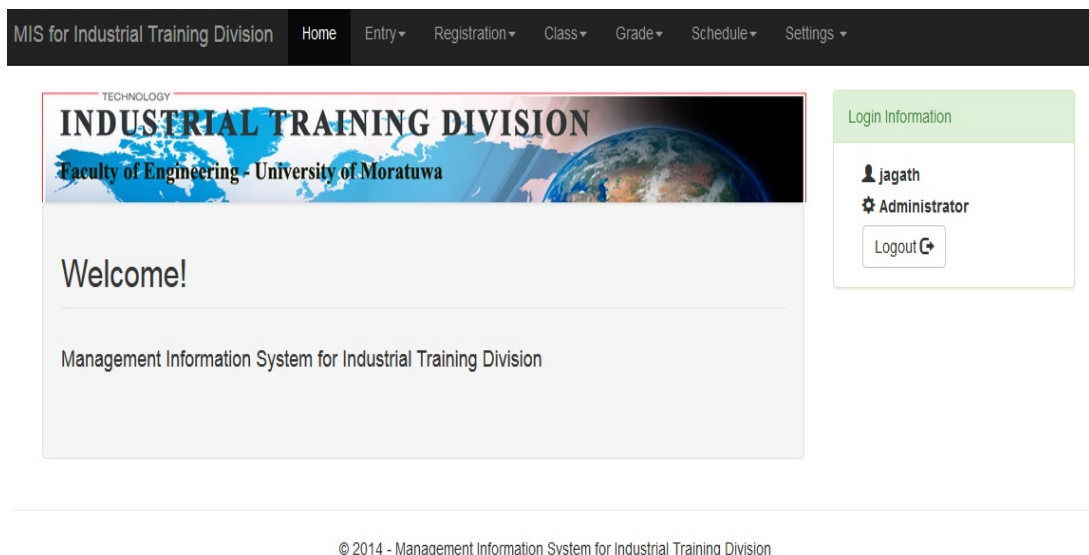


Figure 14: diagram of the Administrator Login Home Page subsystem

Figure 14 shows the Main Home Page and 15 shows the Administrator Login Home Page. This GUI was developed using HTML, PHP. It is worth to mention that many websites available on the internet have been developed using java script for create menus. XHTML forms and combo box were used to create this menu. I believe that this application give a different look to the home page. Relevant GUI design was done using Rational Rose [13].

Majority of the user interfaces such as data entry forms were developed using PHP. One of the data entry form created to prepare student or participants is shown in Figure 15. Once participants details are entered into the system, by typing registration number in “registration number” field and clicking submit button, system fills the “registration number”, “From” and “To” fields as verification that the user has selected the correct period of training. Then the system allows the user to enter session details one by one. Student can be assigned to employee by selecting them from resource person combo box that present list of resource persons taken from resource person subsystem.

The image shows a web-based data entry form titled "New Student". At the top, there is a header with the University of Moratuwa logo and the text "University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations www.lib.mrt.ac.lk". Below the header is a navigation menu with items: "MIS for Industrial Training Division", "Home", "Entry", "Registration", "Class", "Grade", "Schedule", and "Settings". The main content area features a banner for "INDUSTRIAL TRAINING DIVISION" and "Faculty of Engineering - University of Moratuwa". The form itself contains the following fields:

- Registration Number*: ID Number (dropdown)
- Firstname*: First Name (text input)
- Middlename*: Middle Name (text input)
- LastName*: Last Name (text input)
- Gender: Male (dropdown)
- Period of Training: From (text input) and To (text input), both with clear and list icons
- Civil Status: Single (dropdown)
- Age: age (text input)
- Nationality: Sri Lankan (dropdown)
- Religion: Buddhism (dropdown)
- Contact No: Contact Number (text input)
- Email*: Email address (text input)

Figure 15: diagram of the participants' subsystem data entry form

All applets of the system use common java classes for communicating with PHP codes at the server.

5.5 PHP for communication between web and browser

When a PHP page collects data from user inputs, it sends collected data to PHP codes at server because the PHP codes is responsible for storing and extracting data from database. The system uses two classes for such communications, which were reused through entire system. One class is designed to send data to server and other class is designed to get data from the server on client request.

```
function doimport(){  
  
if(isset($_POST["Import"])){  
  
//require_once("includes/initialize.php");  
  
echo $filename=$_FILES["file"]["tmp_name"];  
  
//echo $ext=substr($filename,strrpos($filename,"."),(strlen($filename)-  
strrpos($filename,".")));  
if($_FILES["file"]["size"]>0)  
  
{  
    $file = fopen($filename, "r");  
  
while (($SemapData = fgetcsv($file, 10000, ",")) !== FALSE){  
  
//print_r($SemapData);  
  
global $mydb;  
  
$mydb->setQuery("INSERT into tblstudent  
values('$SemapData[0]','$SemapData[1]','$SemapData[2]','$SemapData[3]','$SemapD  
ata[4]','$SemapData[5]','$SemapData[6]','$SemapData[7]','$SemapData[8]','$SemapDa  
ta[9]','$SemapData[10]','$SemapData[11]','$SemapData[12]','$SemapData[13]','$Sema  
pData[14]')");
```

Figure 16: Implementation of the field data identification form input and output data

5.6 PHP code for generating word documents and Email

In the server, PHP code [11] takes responsibilities to send data to appropriate database and table. In addition to the above, generation of selection letter in Microsoft word format to inform participants for attending the selected course is also done by PHP code (Figure 18). This PHP code connect database and get required information and call word document generation function to create word document with required variable data.

To send email with timetable as an attachment, system uses separate PHP code [10]. After data has been collected a timetable is created in HTML format, the system generates an email and sends timetable as an attachment to relevant resource person. This email generation and word document generation process is system specific. Hence it is needed to add some additional change to the server's system initialization file to this effect. See Figure 18, to view the PHP code written for sending email and attachment.

```
<?php
$stale = 'table_name';
$outstr = NULL;

header("Content-Type: application/csv");
header("Content-Disposition: attachment;Filename=cars-models.csv");

$conn = mysql_connect("localhost", "mysql_user", "mysql_password");
mysql_select_db("db",$conn);

// Query database to get column names
$result = mysql_query("show columns from $stale",$conn);
// Write column names
while($row = mysql_fetch_array($result)){
    $outstr.= $row['Field'].';';
}
```

Figure 17: PHP function for generating selection letter

```

<?php

// a php script to send an email with an attachment
// author: alvin alexander, devdaily.com

require 'Mail.php';
require 'Mail/mime.php';

// static fields
$from = 'SENDER_EMAIL_ADDRESS';
$subject = 'An email message with an attachment';
$text = 'The text version of my message.';
$html = '<html><body>The HTML version of my message.</body></html>';

// dynamic fields
$to = 'RECIPIENT_EMAIL_ADDRESS';
$file = 'my-attachment.zip';

// script begins

$headers['From'] = $from;
$headers['Subject'] = $subject;

$mime = new Mail_mime;
$mime->addTextBody($text);

```



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Figure 18: Implementation of sending email with attachment in PHP

5.7 Printing

Another important module to mention here is the print module. This CMS uses printing facilities given by web browser for printing general-purpose reports. However it was not capable of printing preprinted course certificates. Hence, it was needed to develop a separate print module for printing and previewing the certificates. This module was developed using Printer Job class [12], which is the principal class that controls printing in PHP. This print module uses Printer Job class to print certificates. Page set up and print preview facilities also added to the system. The system uses a preset paper size and locations for printing certificates according to dimensions of ITD certificates. But system has been connected to the native print dialog box for setting up pages that will be useful in future developments.



Figure 19: Screen shot of the print interface and print preview

Figure 20, shows the screen shot of the print module interface. To start certificate printing, Figure 21, shows authorized user should provide “states” to the system by typing status at “Academic Year” field and clicking submit button. Test area list eligible participants for awarding certificates. After user selects the certificate type from “Select Certificate Type” combo box, user can preview and print certificates .Page setup button is given but it will not active for certificate printing.

TECHNOLOGY

INDUSTRIAL TRAINING DIVISION


Faculty of Engineering - University of Moratuwa

Student Industrial Training Records

Grade and Section	Academic Year	Status	Date Enrolled	Options
PASS	2013-2014	New	2015-02-06 04:38:45	Enrolled Course View Transcript

© 2014 - Management Information System for Industrial Training Division

Enroll Student


 Name of Student: jagath, kumara
 University of Moratuwa, Sri Lanka.
 Registration Number: 45
 Field of Study: Transprt and logistics
 www.lib.mur.ac.lk

Details of Training:

Place of Training: Keels super training center
Period of Training:
From: 2014-09-02
To: 2015-02-13
Status : New Student ▾
Year and Section : PASS ▾
Academic Year : 2013-2014 ▾

Figure 20: Screen shot of the enroll student training preview

5.8 Help Sub Module implementation

Simple help system is created for easy use of the system. Any user, who expects to get help can select main topic from the help window. These main topics are arranged on

menu names. Once a topic is selected, system list sub topics related to the selected menu item.

5.9 System Installation

This CMC can be installed on any web server, but it needs considerable time to install Apache, PHP, MYSQL and this CMS system. To increase the efficiency of installation, this system has an installation program. The program me is developed using Windows batch commands. This program I am capable of installing all necessary software components to a new computer that can be set up as a web server in Windows platform. However this installation program will not provide facilities for java installation.

The system runs on windows 7 or Windows XP platform with computers. Which has a 2.3 MHz, or above microprocessor. The system is supported for Linux and related platforms. The system should be installed manually in such platforms.

5.10 Summary

After the completion of system development, system was tested using test cases Black Box technology is used to test the system. Test cases were developed to test the all paths of the system and completed the check. The next chapter explains the test plan and test results.



Testing

6.1 Introduction

This chapter discusses verify and ensure that a system meets its design specifications and other requirements. A test plan is a document detailing a systematic approach to testing system software. The plan typically contains a detailed understanding of the eventual workflow.

6.2 Test Plan

Standard Black box test was applied to test the system [13] in this plan, test cases were developed to check the inputs and related outputs produced by the system. The following are the test cases planed to test the system. These test cases were developed using my previous experience and domain knowledge.

Test case 1: Login Subsystem

Test case 2: Course Subsystem (Training Module)

Test case 3: Resource Person Subsystem

Test case 4: Participant Subsystem

Test case 5: Performance Subsystem

Test case 6: Reports Subsystem

6.3 Testing

There were thirty two components in the system. All these components were tested individually (Unit testing) at the time of development, using the same test technology. After integration of these sub systems and units, the entire system was tested again.

6.4 Test Results


The test case used for testing the access control (Login) sub system and their result at the final run are given in Figure 22. Six data sets were used to test this subsystem. Number of data sets used to test each subsystem depends on their requirement, which

was decided based on my domain knowledge. Test plan, test data and test results are given in appendix 5 and 6 respectively.

Menu Name: Login

Access level

Administrator User Unauthorized access

Test Item	Level	Input	Expected Output	Actual Output
Sign In	1	User ID : bandara Password : nmsa	Open All Menu Items	Same
	2	User ID : thushari Password: remarks	Open All Menu Items	Same
	3	Ser ID : jagath Password: password	Login not successful	same
				
Sign up		Click Submit Button	Show Error Messages	same
		Click Rest Button	Clear form	same
	1	Data Set 1	Registration completed successfully	same
		Data Set 2	Registration completed successfully	same
		Data set 3	Incorrect email address	same
		Data set 4	Incorrect password	same
		Data set 5	You are not authorized	same

Data Set 1:

Initial: KS

Last Name: Kumara

Designation: Programme Officer
 Email address: kumaras@uom.lk
 Postal address: Ellpitiy
 User Id: saman
 Password: password
 Access Level: User

Figure 21: Test case to test Login system

6.5 Summary of the Errors Found

Errors were rectified at the end of system test. A considerable time was spent in and fixing errors. There were several unexpected problems arising in the flow control criteria used in program codes. Some security holes were also found. As an example, the test revealed that any user who accesses the system with user name and password were eligible to change content in all subsystems except logging. Hence, the access control subsystem was further improved to control these weaknesses. Now administrator can control the user involvement of system access by assigning different security privileges to various user groups. Summary of the errors found during the test process is given in Table 2.

Test Case	What is tested	Errors Found	Action Taken
Test Case 1	Access Control Sub system	All users had same access facility	Redefine the access levels
Test Case 2	Training Module Sub system	Any registered user can modify the course details	Changed authorization for course modification only the user who create training timetable
Test Case 3	Recourses Person Sub system	Data will not send to database	Revised the code
Test Case 4	Participant Sub system	Data will not send to database, applets not initialize error	Revised the code
Test Case	Performance	Data entry field lengths	Adjust database fields

5	Sub system	insufficient	
Test Case 6	Reports Sub system	Any user can extract data through SQL commands	Error is fixed changing code to check security privileges of log on user

Table 22: Summary of the errors found during the system test

6.6 Summary

This new system now works properly. Only disadvantage found was the transmission delay between the client servers. This depends on the connection speed of the network or internet. However system could be speed up to some extent, if the system is designed to send collected data of a session in a single transmission rather than multiple transmissions. Details are given in the next chapter with a complete evaluation with both my own views and user responses taken by administrating an evaluation forms.



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Evaluation

7.1 Introduction

This chapter discusses how the proposal solution meets the objectives of the project and accordingly to achieve the ultimate goal of the project. Further, how far and up to which extend, the solution has been successful to its objectives. My view on various aspects of the system is presented here. Especially, technology and tools associated in this work and their suitability is discussed. Performance of the product and possibility of applying this system for other similar organizations are also considered. Further this chapter expands to explain the user's appraisal about the system interaction in two different levels of user privileges

7.2 Assessment

This industrial training management system is a web based system that can be accessed through a web browser. Transmission media may be a local Intranet system or Internet depending on enforced security restrictions. Security restrictions can be enforced according to the requirement of university IT policy management. If the system is installed in web server then it is accessible through the internet. But if the program is installed in a departmental local intranet server, it gives access only to local machines. Using web based features as an advantage, users don't have to be at their own/ specific computer to use them. This feature is very important to the busy TTD training staff.

Another advantage of the web based system is that all modifications to the system are done at a single point. In traditional client server system, once a modification is done, system administrator had to make sure that every client computer was up dated successfully. This is difficult task when there are more than 200 client computers available in the intranet. Another useful feature of this system is adaptability to other operation systems such as Linux and Solaris. Hence TTD can use this program independently from software platforms and hardware.

7.3 Deviation from an e-learning System

This system is not an e-learning system because this system will not provide facilities such as on line course content management. Grade reporting tool, download & upload facilitate of academic activities, Student account administration tools. Course announcements, calendar administration tool, and Group work areas etc. Instead of above mentioned facilities, this system facilities ITD staff to record training participant`s data ,store employees and training students content, create timetable and assign employees, record participant performance such as examination marks, attendance ,prepare list of eligible participants for awarding course certificates etc. ITD does not expect such eLearning system and it is not needed to develop such systems in house because e Learning systems are freely available on the net.

7.4 Increase of efficiency

However ITD CMS provides a solution to improve the efficiency of ITD Training management activities while reducing training-processing time . Further this system improves the flexibility to work in collaboration with ITD consultants, registrar and program management staff virtually from anywhere. This means that the system allows its stakeholders to work over the ITD intranet or public Internet.



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The system offers facilities to automate ITD `s Training management work. The system is designed for ITD requirements and facilities available in this system especially cater for ITD requirements. However the system could be adopted for other similar organizations with only a few changes.

In this project I understood that the development of generalized CMS application like Moodle, (off the shelf software) is so difficult than developing of a system for single organization. It needs teamwork with spending reasonable long time period for developing a generalized system. But in this project, the total system was developed Within given limited time period by me.

7.5 Technology

This CMS system can be installed on any host that runs on Apache Web Server, MySQL, and PHP. This is a convenient feature for very busy users as they can work at anywhere and anytime if the system access is given on the web. Further this system enables organizations to benefit from low cost administration, and increased

information accessibility offered by web-based applications, while maintaining the strengths of client/server computing.

Main GUI (Home Page) of this CMS contains a HTML and PHP frame. In general, HTML and PHP frames are used to present multiple views with independent HTML documents in the same browser window. Getting this as an advantage, this system uses first frame to display a static banner, second a navigation menu and a third the main document that can be scrolled through or replaced by navigating in the second frame.

MYSQL database is more convenient than other databases for web applications because MYSQL can connect easily with server side scripting languages like PHP. Other common databases require the use of ODBC or JDBC connectivity. This is one of the advantages of MYSQL over other data base. Further, MYSQL simplicity made it so fast. Users can simply use SQL commands for handling the data base .This was very convenient for developing this CMS. My opinion is that, MYSQL is ideal for managing dynamic web content in any web application. Only disadvantage of MYSQL (Server version: 5.6.16 - MySQL Community Server (GPL)) that I found was lack of referential integrity check. This should be achieved in the application code. That puts more presser on programmer when compared with other data bases such as Oracle.

All reports in this system were developed using PHP and HTML tags. All web browsers support those web formats. Hence it was not needed to program separate printing facilities for general- purpose reports, because those reports could be printed using printing facilities provided by web browser. However this printing facility was insufficient for printing the certificates, as it requires more convenient controller for printing on pre-printed certificates. Hence a separate java class is created for printing certificates and related documents generated by the system.

Use of Java or any other languages for report processing is somewhat difficult because it needs separate code to handle printing. General language applications such as Java applets, Visual JSharp Broeser Controls will not support direct access to the resources of client machine when it is used for web programming. Java applets allow using local system resources if local system`s security policy applet is signed.

7.6 System performance, robustness and security

According to the tests carried out, the system satisfies the original requirement specifications to work in multi user environment. This CMS access time is tested in the ITD intranet using 2 client machines, which has 100 Mbps local connection and it was found that average time for opening the interface in any browser was 2.3 second. Opening time for java applets was 16,6 seconds. Sever response time for data request was 3.9 second. These tests were carried out using client machines with 2.4 MHZ Intel Celeron micro processors and Windows 7 and Windows XP platforms. Sample size was 10. However the system will open in Linux operating system with conqueror browser in less time than specified above. But it was not possible to carry out a rigorous test on the Linux environment due to the lack of sufficient computers with Linux OS. At the stage of testing, database had ten records but server response time may be increased when number of records in database is increased.

This CMS is robust enough to handle many unexpected situations. System also has a satisfactory level of changeability as this CMS was designed in sub system architecture. Any new amendments or changes can be done into any subsystem or its database without affecting the rest of the system.



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In the security, system is protected through a password system. System restricts unauthorized access through this password system and passwords and user names are stored in a separate database. Always these passwords are encrypted using One-Way string encryption (hashing) technology before traveling from client to the server. In the server, those data were secured by both physical and logical security. Internet access is controlled through firewall.

7.7 System appraisal

After the completion of the system, user training was provided. After the training, users` feedback was obtained through a questionnaire (See Appendix 8, a web based training management system, System appraisal from- user views). This questionnaire was distributed among a group of 10 users in the organization. They were allowed to evaluate the system by accessing with different user privileges. For this purpose, two questionnaires were given to each user marking them as standard user and guest user. Completed questionnaires were collected and tabulated. Table 3 shows the assessment results of the standard user group.

		Responses % out of a sample of 10				
Overall assessment		A	B	C	D	Total
		Very good	Good	Normal	Not up to the expected level	
1	User friendliness	0.0	30.0	70.0	0.0	100.0
2	Speed	70.0	20.0	10.0	0.0	100.0
3	Appearance	20.0	60.0	20.0	0.0	100.0
4	Security	40.0	60.0	0.0	0.0	100.0
Functionalities of menu items						
1	Login	10.0	60.0	30.0	0.0	100.0
2	Training Module	0.0	80.0	20.0	0.0	100.0
3	Resource Person	0.0	60.0	40.0	0.0	100.0
4	Participants	10.0	70.0	20.0	0.0	100.0
5	Performance	20.0	60.0	20.0	0.0	100.0
6	Reports	40.0	50.0	10.0	0.0	100.0
7	Help Menu	10.0	40.0	50.0	0.0	100.0

Table 23: Assessment values in percentages for Standard User privileges

According to the results, only 30% of users have stated that the user friendliness of the system is “Good” and 70% of them have stated as “Normal”. This analysis also shows that 70% of users stated the system speed is “Very Good”. 20% of them have stated the system speed is “Good” and others opinion is “Normal”. Appearance is stated as “Very Good” by 20% of users, and 60% stated as “Good”. Opinion of the rest is “Normal” . Among these 10 users, 40% of them say that the system as “Very Good” in security and others say as “Good” in security.

7.8 Summary

Further this table shows percentage of assessment results for each menu items. All these indicated that there is trend towards the “very good” and “good” categories for each assessment attribute except the user friendliness attribute. This proves that the system is working up to the satisfaction. Complete set of assessment results are given in the appendix 8.

The next chapter describes the conclusions made about this CMS system based on the evaluation discussed in this chapter.



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CHAPTER 08

Conclusion and Suggestions

8.1 Conclusion

Throughout this dissertation, we have presented the development of a web based Training Management system. In this final chapter, we will discuss the achievement of the system.

According to test results and trial runs, it was shown that this CMS is capable of solving ITP Training management problems, which were identified at the beginning of this project. Accordingly, the performance results have proved that the system is capable of

1. Empowering decision – making on Training Management.
2. Providing single point access to perform all related tasks
3. Performing Training Management activities at high level of efficiency
4. Maintaining training standards, quality and security features
5. Minimizing application delays
6. Improving the reliability and confidentiality

8.1.1 Empowering decision- making on Training Management.

This system has provided an automated mechanism to generate up to date Training statistics, viewing participant`s training history and viewing course, participant, and resource person details. The system allows a user to feed the data into the system and modify existing data. The system has a central database system eliminating redundancy and facilitating easy update. Hence the system helps management to obtain up to date training statistics by querying at their desktop. With this information ITD management is empowered with correct and effective decision making capabilities related to the training management activities.

8.1.2 Providing single point access to perform all related tasks

Accessing single point location for creating training module , assigning resource persons and selecting participants , has increased the system efficiency. In the

traditional system, several officers are involved in such activities. Hence the system is heavily depended on personals and its ultimate result is the inefficiency. Further this new system has increased the speed of the data entry while avoiding unnecessary redundancy.

8.1.3 Performing high level of efficiency.

The existing system has various unnecessary activities. For an example, once a Training is schedule, the hard copies of the course timetable are send to all Training Managers and staff. They maintain separate files for courses conducted in each semester and other related course information. In the new CMS system, it is not needed to send copies of timetables to these managers because they can view course timetables at their desktop. Hence additional file maintaining activities by other branches of ITD are being eliminated. Further, the existing system heavily depends on their private contacts to identifying resource persons. However the proposed new system provides a database of resource person that can be accessed by all coordinators and other relevant users to contact resource persons. Hence, this system has been affected to increase the efficiency of ITD Training Management activities.



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8.1.4 Maintaining training standards, quality and security features

The system supports the maintenance of the training standards and quality of the ITD Training programmers' by monitoring ongoing Training, preparing attendance certificates and course certificates, preparing participant selection letters and recording participant performance. This system use data stored in the database that will affect to prevent malpractices and affect to increase reliability.

8.1.5 Minimizing application delays

The system is capable of preventing delays by providing additional digital channel for participants to register for training on line and sending invitations via email for resource persons to conduct lecture sessions. In traditional systems these activities were done through post or by hand that is a long procedure with personal dependence.

8.1.6 Improving the reliability and confidentiality

System has improved the reliability and confidentiality of training data by controlling system access by adding security for access control over traditional system. Because, in traditional systems, all records are maintained as files and those files are maintained in an unsafe file cabinets. Hence this poor security arrangement affects on the reliability and the confidentiality of the course management activities. In this new system, information is stored in electronic media that is secured with both logical and physical security arrangements. As an example, only the authorized users through a web browser can access training details. But they cannot access server without prior permission. This arrangement affects to improve the reliability and the confidentiality.

Hence, we conclude that the system has achieved the project objectively specified in the chapter one.

8.2 Suggestions and future works

This CMS provides facilities for on line training registration. But it will not handle on line training booking systems. However, if ITD decides to provide on line training booking facilities, this system can expand by connecting a training booking gateway to the ITD web site.

Further this system does not handle record keeping about training and employees details. The system can be enhanced by creating these facilities. Another related facility needed is automating training receipt issues. Such module include facilities to indicate paid amount both in figure and in words,

A sub system for handling automated examinations can be added through this subsystem, it should facilitate to conduct examinations and practical tests on line Training certificates registration facility is also not available in this CMS . Hence those facilities can be developed as a future development.

Further this system can be improved by adding attendance management facilities. At present this system provides facilities to record aggregated attendance using biometric authentication devices such as finger print scanners or eye retina scanners.

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APPENDICES



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DIVISION 105**



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PROJECT CHARTER

Name of the Candidate: J.K.KATHRIARACHCHI

Index No. 129158F

Registration No. 129158F

E Mail: jagathk@uom.lk

Title of the project: Management Information System for Industrial Training Division

Executive Summary:

The Industrial Training Division of the Faculty of Engineering is an independent service unit functioning under the Director, Industrial Training. It is mandatory that all undergraduates after completion of their Level 3 examinations also undergo 24 weeks of industrial Training (Module No. 3990) and obtain 6 Non-GPA credits for the award of a B.Sc. (Honours) Degree from the Faculty of Engineering. All undergraduates of the Faculty of Engineering are offered industrial training at either a government institution or a private company in Sri Lanka.

At present, all these Training are managed by a paper based system. This system has several drawbacks. In this project I expect to develop a user – friendly, automated on line Training Management System to overcome the existing drawbacks using present web technologies.

1.1 Introduction

Division ITD is a training organization dedicated for training of all under graduate students in under the faculty of Engineering offers more than 100 different training programs annually for the students. Currently a paper based training management system is used for managing the training programs .This paper – based system is not efficient enough to cater for the increasing demand. Further it has significant drawbacks in generating up to date training statistics necessary for the management.

1.2 Problem Domain

On the current system, Industrial Training Division Management activities commence after receiving application from the undergraduate registrar. First activity is sorting

and grouping of application according to the student No., Student Name, Faculty, Department, Course files are created from stored application.

After selecting or scheduling of category student, suitable participant are selected from the relevant applications. Staff coordinator is the person responsible for these activities.

Based on the section the ITD staff sends invitation to the training places or else NAITA, to conduct relevant selected student and sent selection letters to the participant information them to attend proper training places.

According to the schedule or especial from coordinator, registrar, IDT Staff will arranged examination of the industrial training module. The student sent weekly report, monthly report, NAITA diary and final training report also record assignment given for a mark. The data in used for processing of final mark result.

At the end of each trainee, evolution is done through individual undergraduate course evolution from collected participant. A course evolution system is used to analyses responses and prepares report. According to the trainee's attendance get the via training places and final training report result of examination and based on the assignment (depend on applicable rules), ITD staff or relevant person responsible preparation participant training certificates. The complete set of description of domain activities is given in appendix A.

This system has following drawbacks.

- Difficulty of collecting of course training statistics which are necessary for the management.
- No proper way to find number of training a particular participant participated within a calendar year.
- Difficulty of handling the increasing workload.
- No way to submit online applications for efficient processing

1.3 Project Goals and Objectives

The project objective is to develop an efficient and effective web-based training management system to

- Handle increasing work load
- Offer on line registration facilities for participants
- Reduce paper work
- General training statistics

1.4 Similar work and relationship to the project

At present, ITD has an Intranet, which is idle. This Intranet can be used for testing and implementing of this project.

1.5 Scope of the Project

Study of the existing system and design and implement a new web based system to improve the efficiency while minimizing the paper work. This new system will include facilities for ITD consultants and staff of the registrar to

- Develop and maintain training online
- Store and maintain the details of participants and training records.

Monitor participant's assessments for long-term course such as Degrees, Diplomas etc.



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Study of the existing system and design and implement a new web based system to improve the efficiency while minimizing the paper work. This new system will include facilities for ITD consultants and staff of the registrar to develop and maintain training only.

All the activities described in section 2 of above will be taken into the new online system. System will provide web interfaces for feeding training details and participant details to the database. Based on course details provided to the system, it will generate emails for communicating between coordinators and registrar for necessary training information.

Further it will provide the web interface for remote participants to register online for training. The system will generate and send emails to acknowledge the receipt of the application. Once participants submit their online applications , these applications will be directed to the registrar as emails. System will produce necessary course statistics for requirement of ITD management.

HTML, XML,PHP, Apache and MYSQL technologies will be used for this project.

1.6 Deliverables

A web based course management system.

1.7 Parameters for the measurement of success

Satisfaction of the clients, which will be measured by using the user comments collected through questionnaire.

1.8 Risk and Risk Mitigation Plan

Software system may be rejected due to user un-satisfaction. That can be eliminated by continuous communication with domain users.

Further it will provide the web interface for remote participants to register online for training. The system will generate and send emails to acknowledge the receipt of the application. Once participants submit their online applications , these applications will be directed to the registrar as emails. System will produce necessary course statistics for requirement of ITD management.

HTML, XML, PHP, Apache and MySQL technologies will be used for this project.



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SYSTEM STUDY AND DESIGN

2.1 Industrial Training Procedure

1. Undergraduate Division (UGS) sends names of Level 3 undergraduates who have registered for modules 3992 & 3993 to the Training Division.
2. Industrial Training Division informs the details of such students to National Apprentice & Industrial Training Authority (NAITA).
3. Registers are compiled for the 10 Departments with Name and the University ID numbers of students.
4. NAITA sends the vacancies available for the relevant year to the Training Division.
5. Vacancies are displayed on the Training Division's Notice Board. Copies are also sent to the relevant Departments.
6. Director & other Senior Officers in the Training Division meet the 10 fields of Students separately to make them aware of the Industrial Training Programme & related matters including issue of Industrial Training Guidelines.
7. Students hand over the option forms to the Ind. Training Division through each field representative indicating the order of preferences for placement in the industry.
8. After completion of selection, the lists of placement send to the NAITA.
9. Issue Letters of placement, daily diaries, contract Forms and site forms by NAITA representatives.
10. Trainees send four weekly Continuous Assessment sheets (Monthly Reports) to the Training Division during the period of training.
11. Trainees are visited during training by departmental, NAITA & the training division staff. Supervision Reports by the visiting personnel are submitted to the Training Division.



12. After Completion of Industrial Training students submit the Industrial Training Report & Daily Diary to the Training Division.
13. Industrial Training Assessment Schedules are prepared by Training Division in conjunction with the 10 Depts. & NAITA.
14. NAITA sends Mark Sheets for use of the panel members.
15. After training assessments are completed the results compiled by the Training Division are sent to the Exams Division on a format supplied by the Undergraduate Studies Division. In addition a further detailed result sheets are compiled by Training Division that include admission number, name, place of training, period of training, date of assessment & the final grade.
16. Issue of Industrial Training Certificates to the students.



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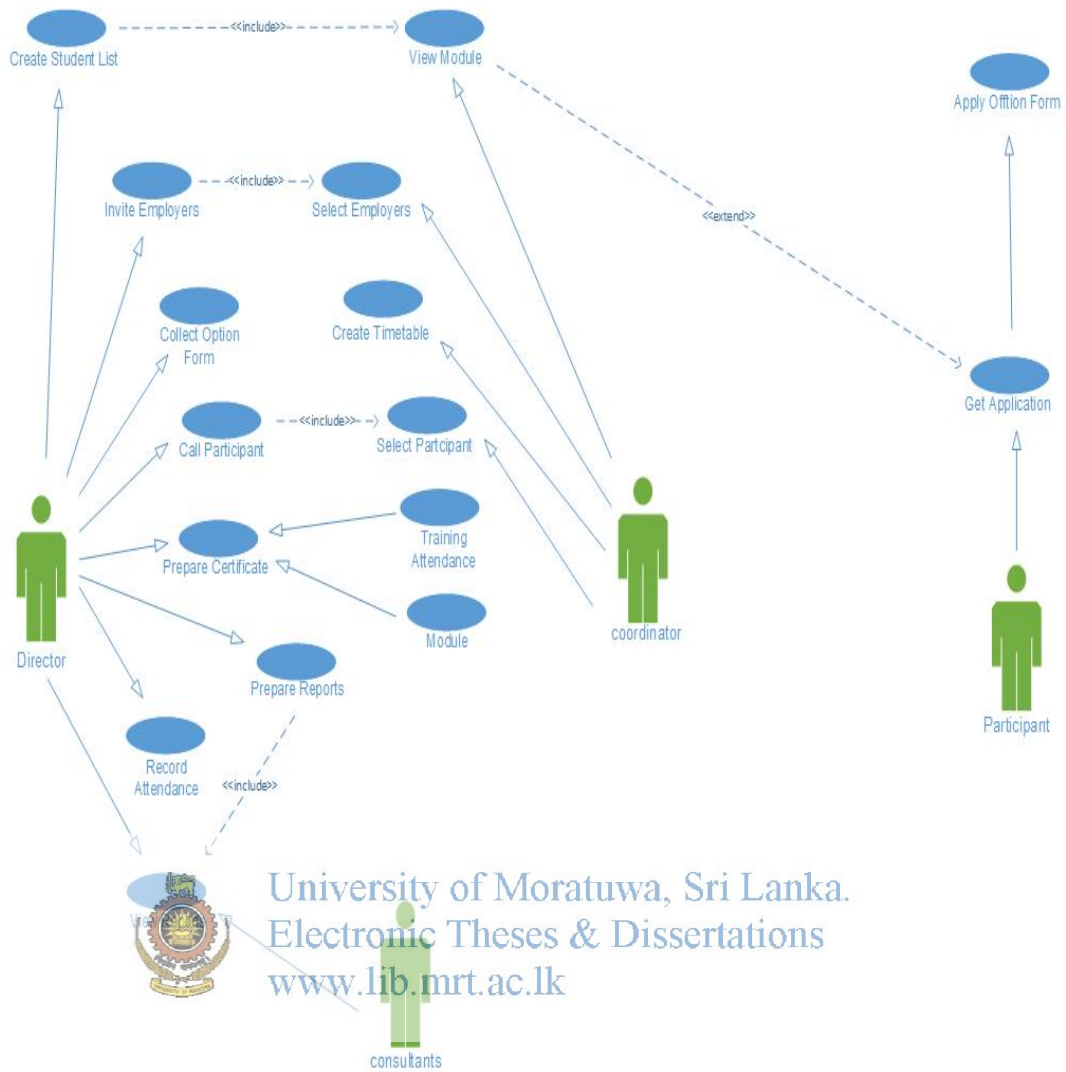


Figure 24: Detailed Use Case diagram of the existing industrial training management system

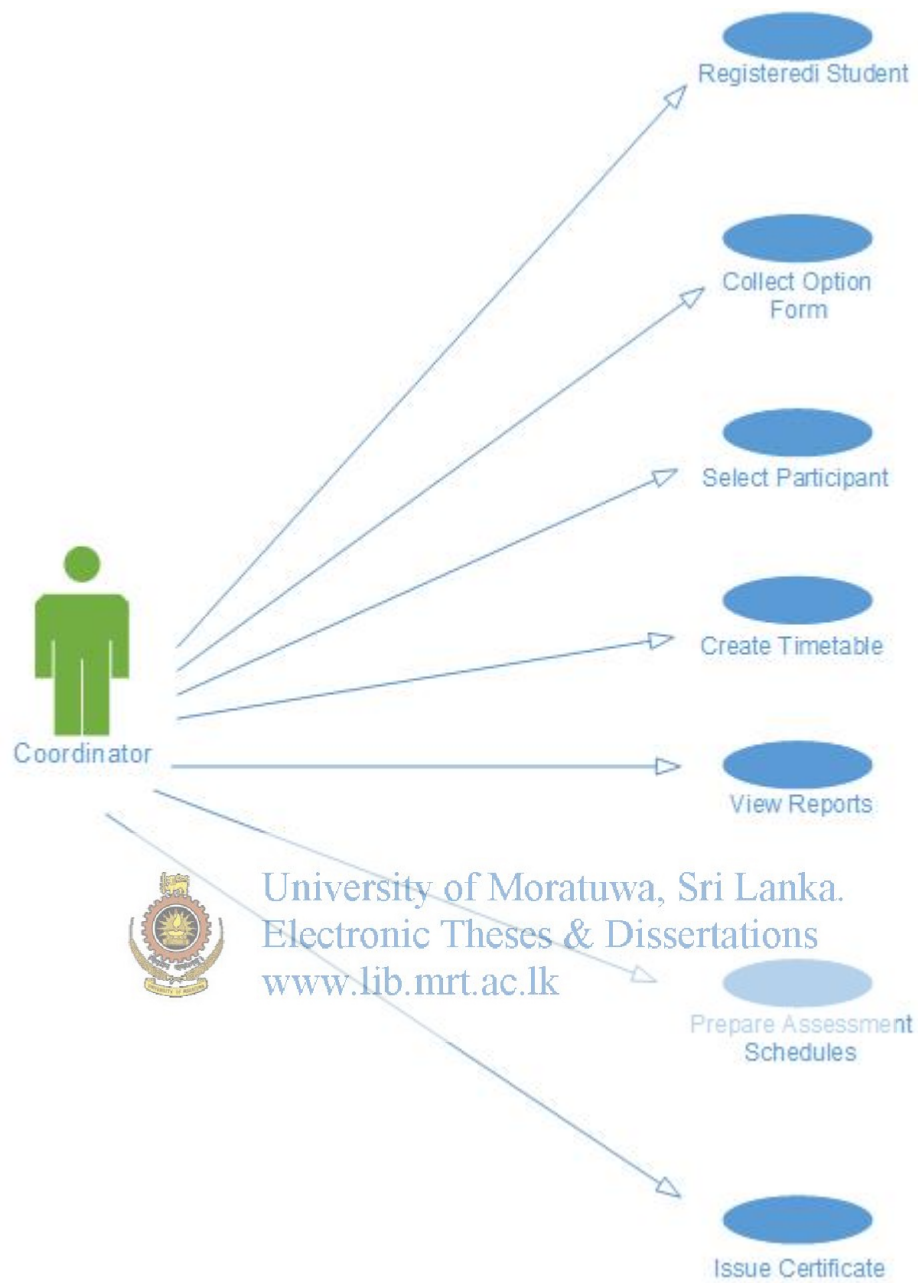


Figure 2: Coordinator Use Case

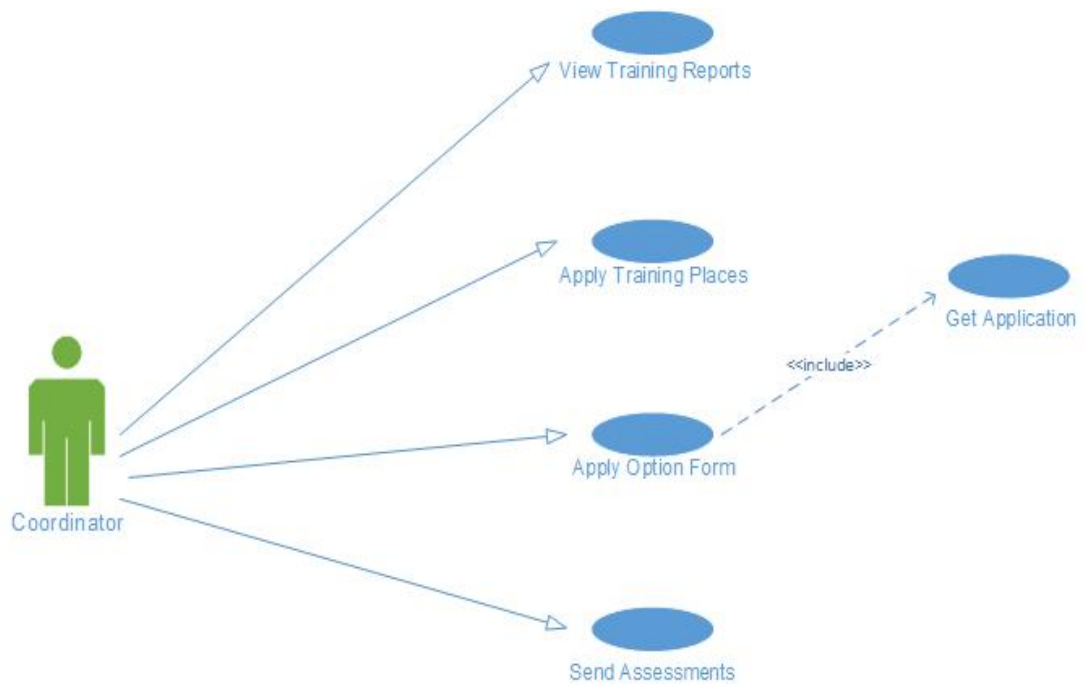


Figure 3: Participant Use Case



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Figure 4: Other Manager Use Case

2.2 Design of the Proposed System

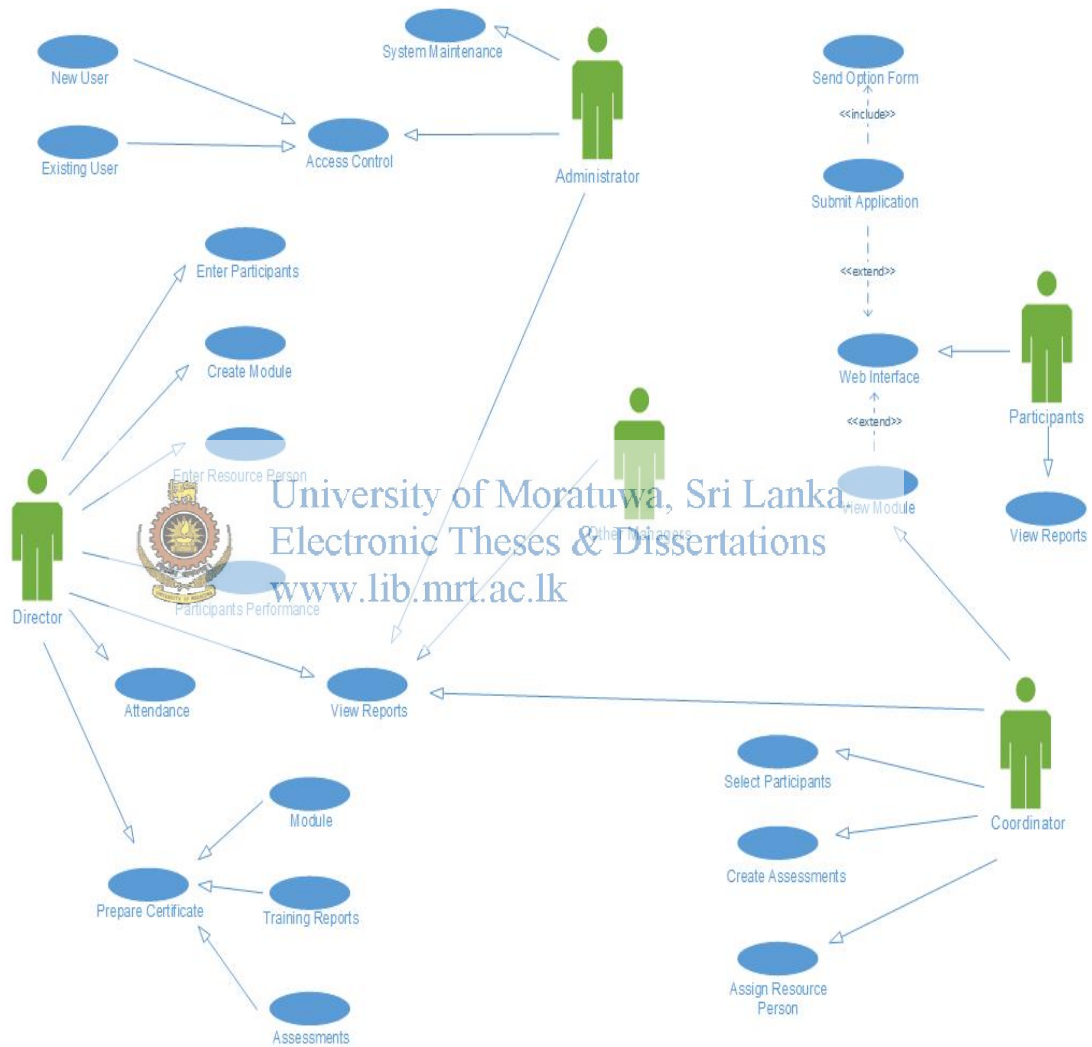


Figure 5: Detailed Use Case diagram of the proposed industrial training management system

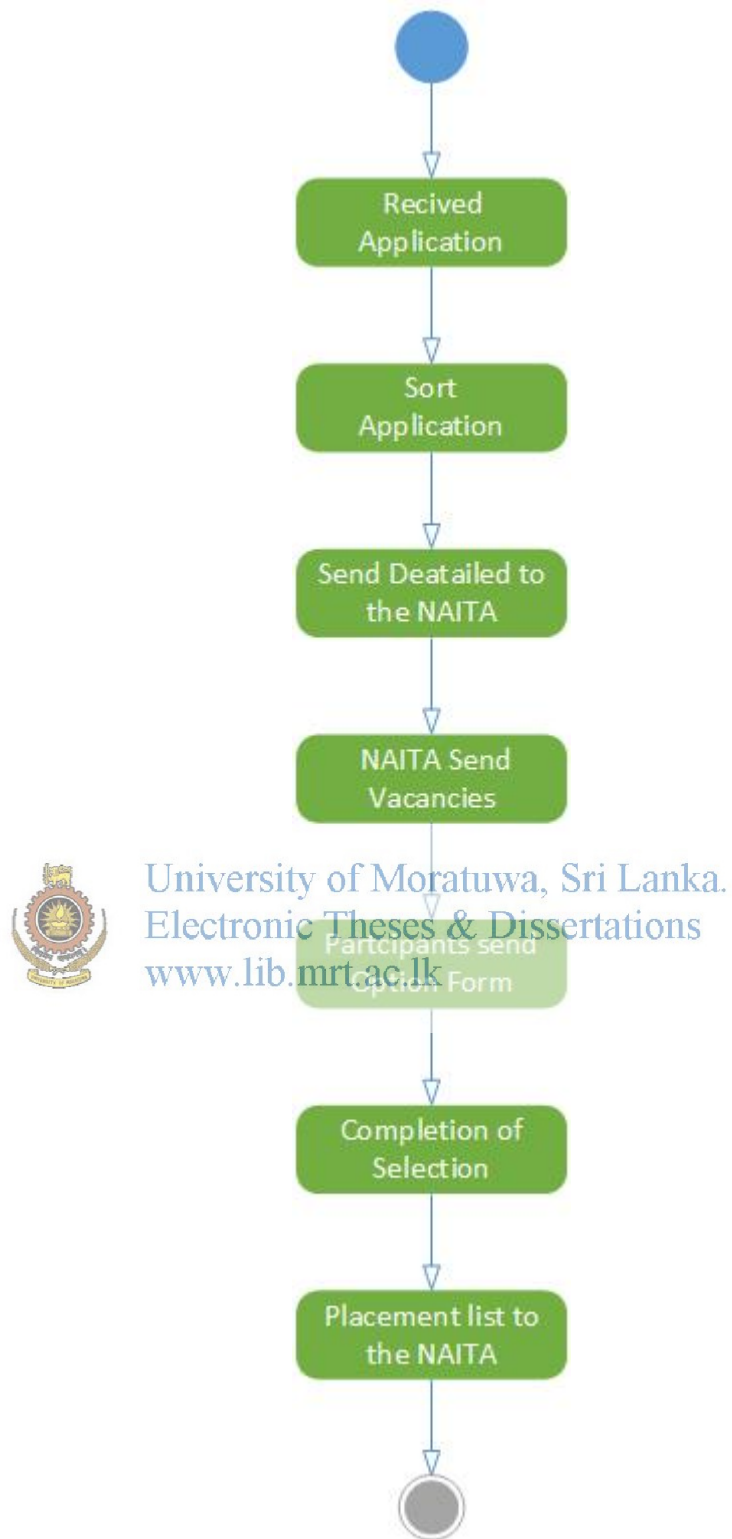


Figure 6: Activities of collecting application forms

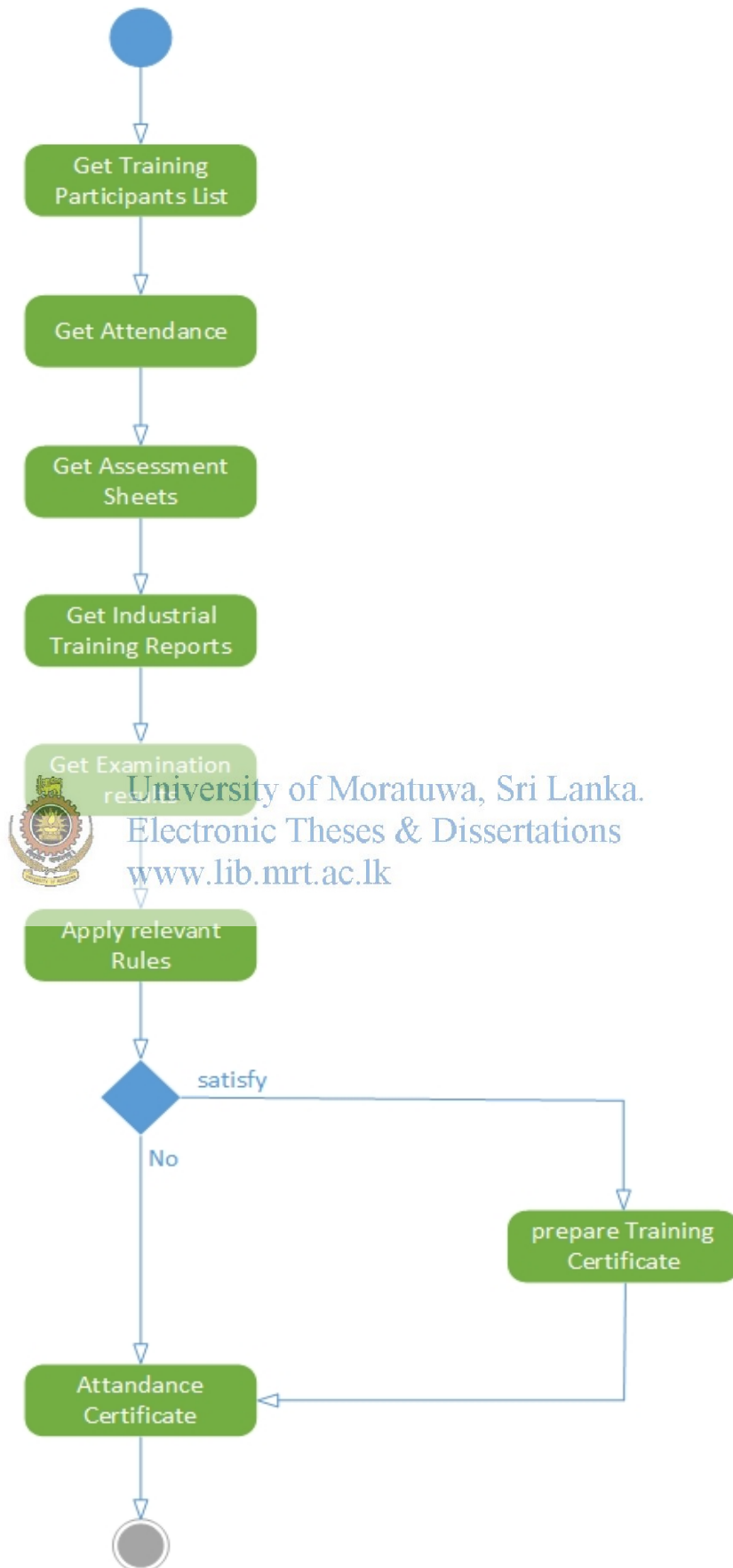


Figure 7: Activities involved in preparation of certificates

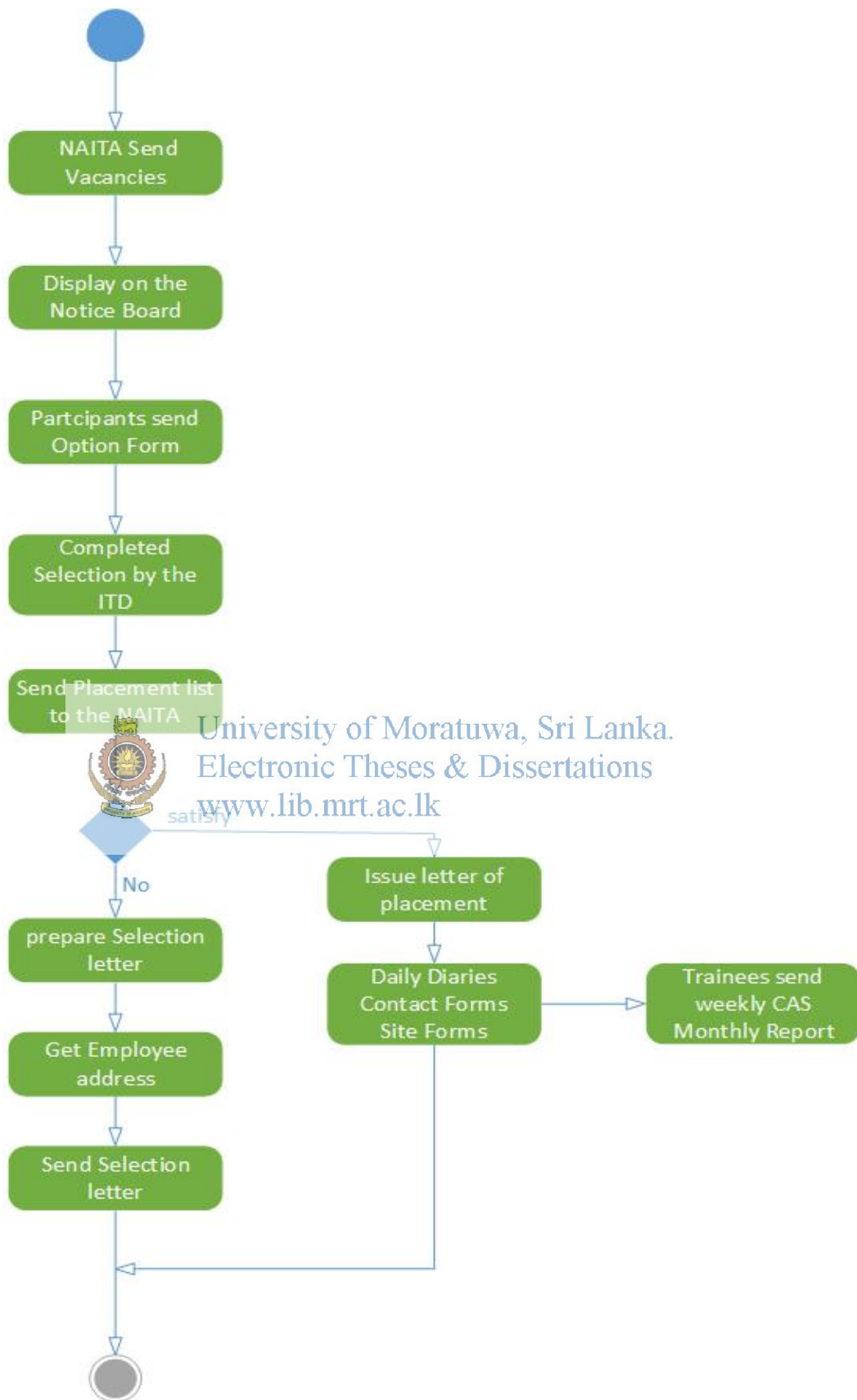


Figure 8: Activities Involved in sending selecting letter

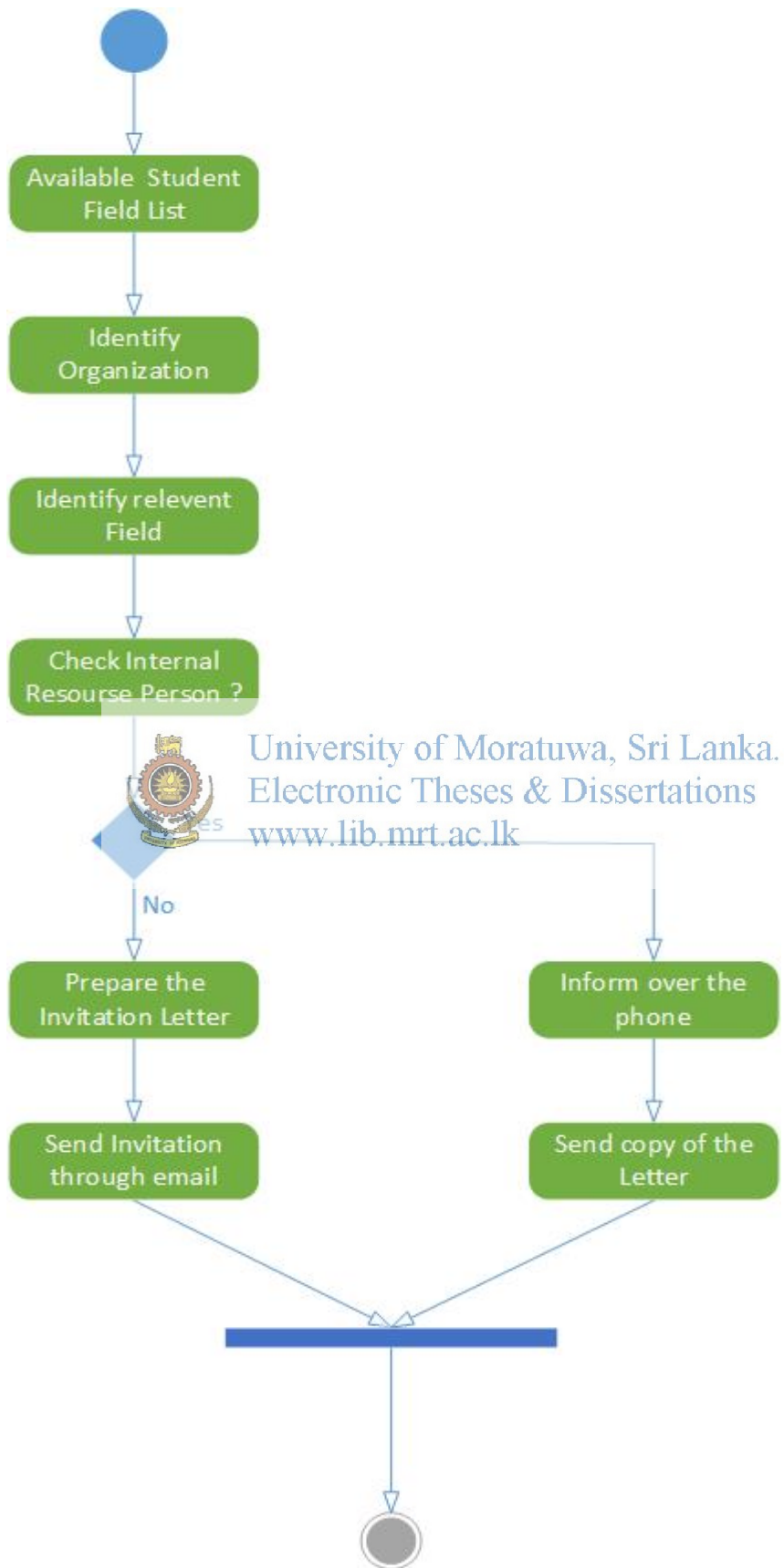


Figure 9: Activities of Inviting Employees



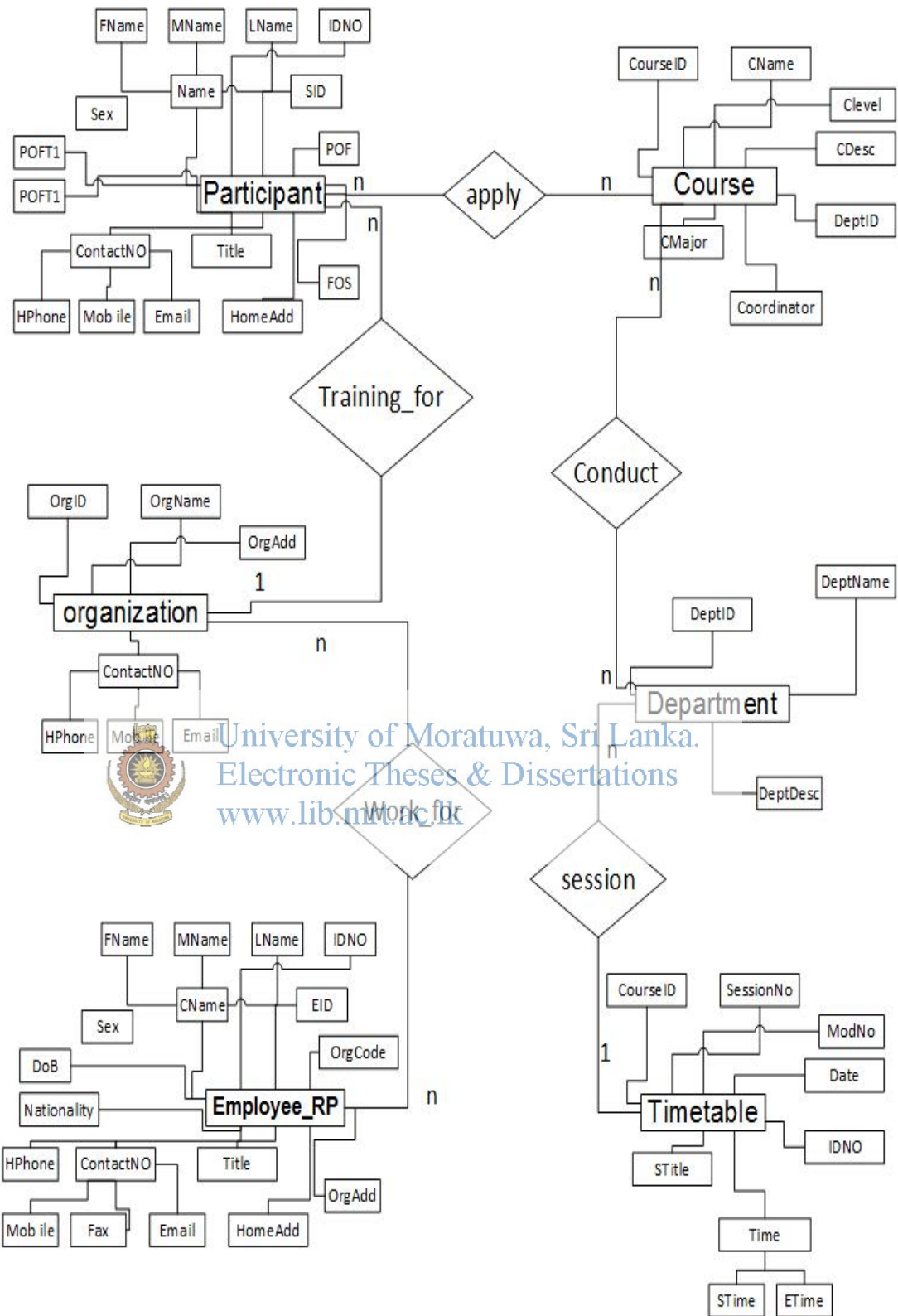
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DATABASE DESIGN – ER DIAGAM

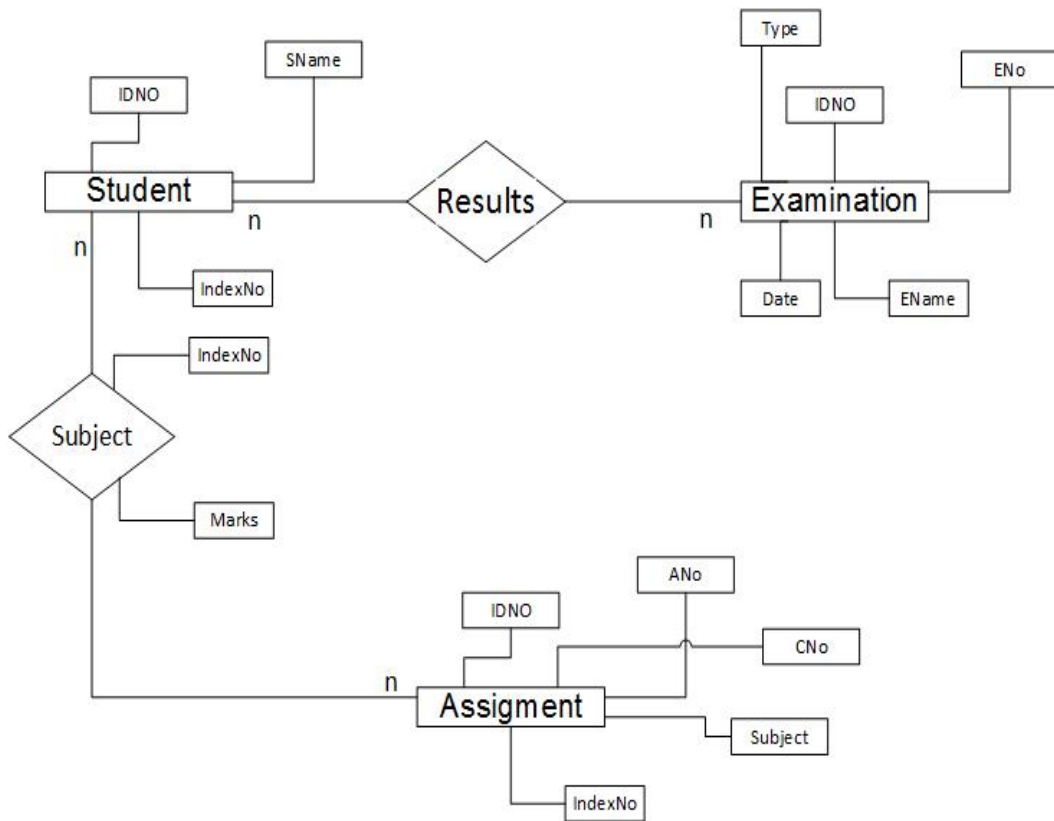
3.1 Training Management System Database



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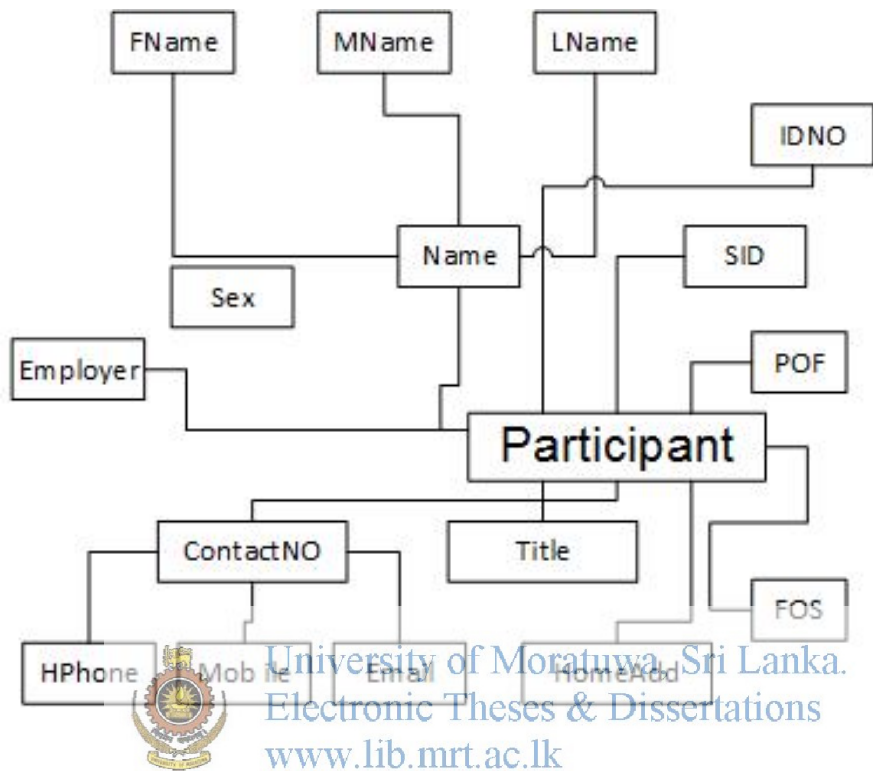


3.2 Examination Database

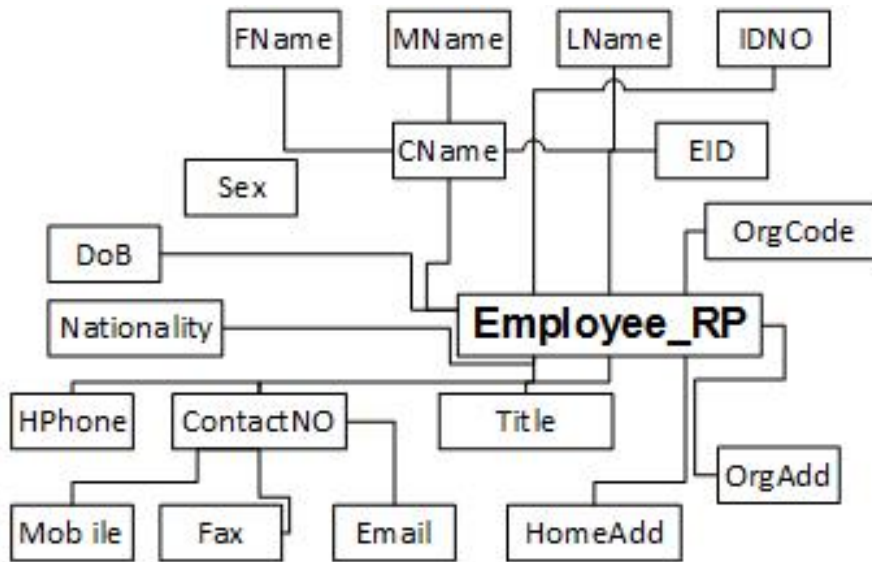


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3.3 Participant Database



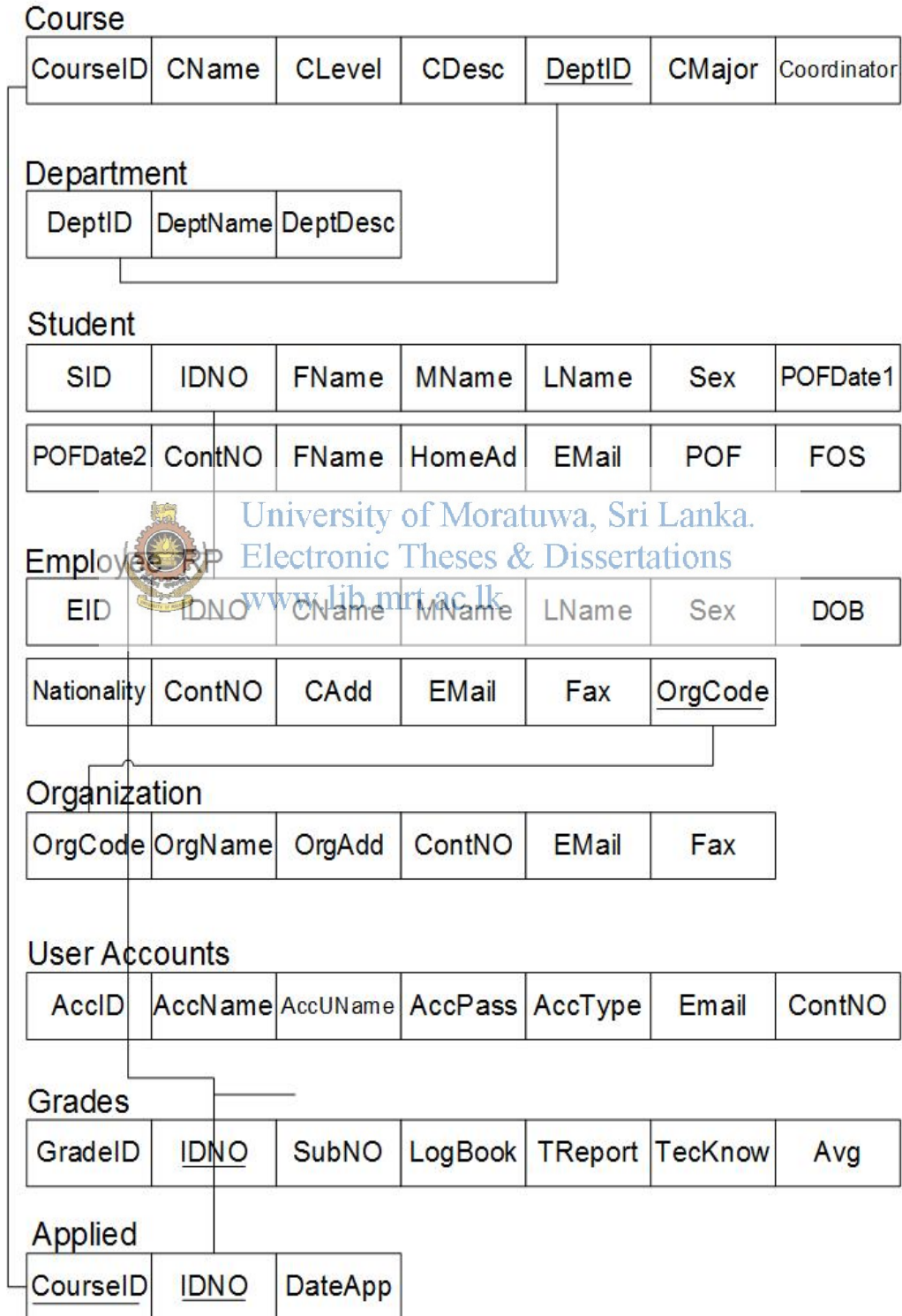
3.4 Resource Person Database



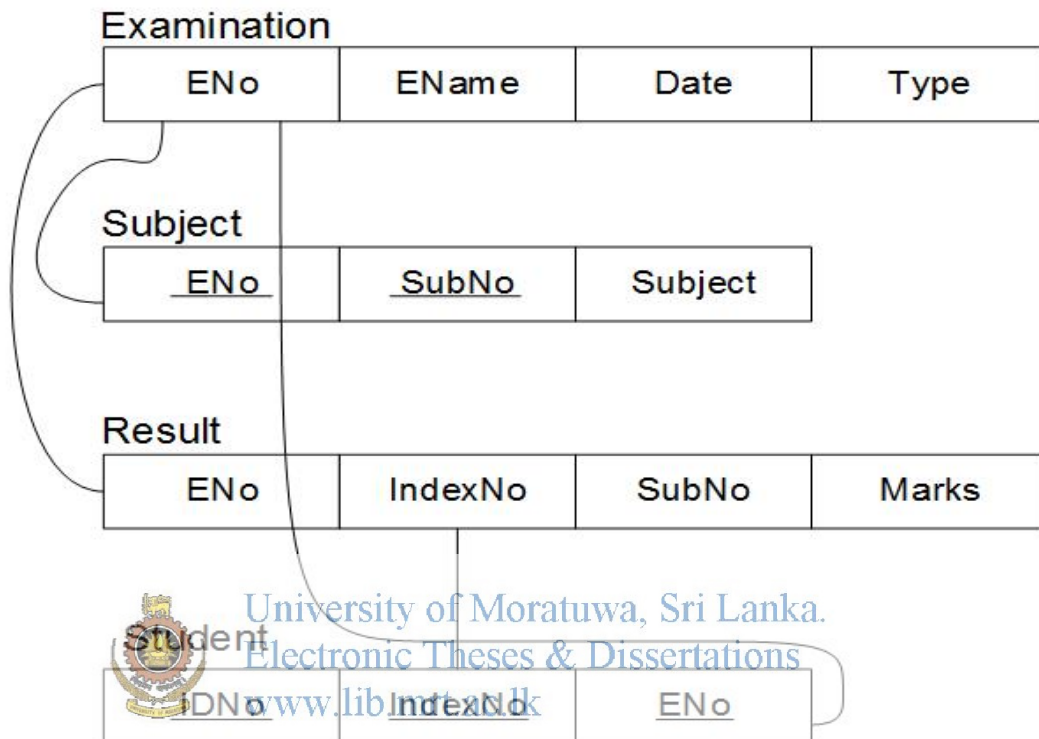
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ATABASE SCHEMA

4.1 Training Management System Database Schema



4.2 Examination Database Schema



TEST PLAN

5.1 Test Cases

Test 1: Login Sub System

Test No	Test	Steps needed to carried out the test	Expected result
1	Login	Open login dialog box enter user name and password	If password accepted, system menu will open
2	Sign Up	Open login dialog box enter registration detail	User registration will accept, if user entry is done by administrator or any authorized
3	Change password	Open change password dialog box enter new password	Allow to change password if change is done by administrator or any authorized

Test 2: Module Sub System

Test No	Test	Steps needed to carried out the test	Expected result
1	Create Module	Open create module dialog box enter data	If it is a new record, accept. Other wise view existing information for editing
2	List Module	Open list module dialog box	List all available courses
3	Add participants	Open add participants dialog box enter data	Allow select participants for module on registration no
4	List participants	Open list participants dialog	List selected participants in

		box	detail
--	--	-----	--------

APPENDIX 06

TEST CASES AND TEST RESULTS

6.1 Test Plan

Standard Black box test was applied to test the system [12] In this plan , test cases were developed to check the inputs and related outputs produced by the system. The following are the test cases planed to test the system. These test cases were developed using my previous experience and domain knowledge.

Test case 1: Login Subsystem

Test case 2: Course Subsystem (Training Module)

Test case 3: Resource Person Subsystem

Test case 4: Participant Subsystem

Test case 5: Performance Subsystem

Test case 6: Reports Subsystem

6.2 Test Results

The test case used for testing the access control (Login) sub system and their result at the final run are given in Figure 22. Six data sets were used to test this subsystem. Number of data sets used to test each subsystem depends on their requirement, which was decided based on my domain knowledge. Test plan, test data and test results are given in appendix 5 and 6 respectively.

Menu Name: Login

Access level

Administrator User Unauthorized access

Test Item	Level	Input	Expected Output	Actual Output
Sign In	1	User ID : bandara Password : nmsa	Open All Menu Items	Same
	2	User ID : thushari Password : remarks	Open All Menu Items	Same
	3	Ser ID : jagath Password: Password	Login not successful	same
Sign up		Click Submit Button	Show Error Messages	same
		Click Rest Button	Clear form	same
	1	Data Set 1	Registration completed successfully	same
		Data Set 2	Registration completed successfully	same
		Data set 3	Incorrect email address	same
		Data set 4	Incorrect password	same
		Data set 5	You are not authorized	same

Data Set 1:

Initial: WMSJ
Last Name: Weerasuriya
Designation: Programme Officer
Email address: saman@uom.lk
Postal address: Ellpitiy
User Id: saman
Password: password
Access Level: User

Figure 250: Test case to test Login system

The flow control criteria used in program codes. Some security holes were also found. As an example, the test revealed that any user who accesses the system with user name and password were eligible to change content in all subsystems except logging. Hence, the access control subsystem was further improved to control these weaknesses. Now administrator can controlled the user involvement of system access by assigning different security privileges to various user groups. Summary of the errors found during the test process is given in Table 2.

Test Case	What is tested	Errors Found	Action Taken
Test Case 1	Access Control Sub system	All users had same access facility	Redefine the access levels
Test Case 2	Training Module Sub system	Any registered user can modify the course details	Changed authorization for course modification only the user who create training timetable
Test Case 3	Recourses Person Sub system	Data will not send to database	Revised the code
Test Case 4	Participant Sub system	Data will not send to database, applets not initialize error	Revised the code

Test Case 5	Performance Sub system	Data entry field lengths insufficient	Adjust database fields
Test Case 6	Reports Sub system	Any user can extract data through SQL commands	Error is fixed changing code to check security privileges of log on user

Table 1: Summary of the errors found during the system test

APPENDIX 07


SYSTEM APPRAISAL

System appraisal form

A Web based Training Management System

System appraisal form – users view

For office use only

 User Type Administrator <input type="checkbox"/>	University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations www.lib.mrt.ac.lk	User <input type="checkbox"/>	Guest <input type="checkbox"/>
Administrator has system administrative privileges			
User has privileges for data entry and modification			
Guest has privileges for viewing data			

Please study the system carefully. Select appropriate answers and underline ction

1. Training Management System Interface – Overall assessment

1.1 User friendliness

A .very Good B. Good C. Normal D. Not up to the expected level

1.2 Speed

A .very Good B. Good C. Normal D. Not up to the expected level

1.3 Appearance

A .very Good B. Good C. Normal D. Not up to the expected level

1.4 Security

A .very Good B. Good C. Normal D. Not up to the expected level

2. Login Menu Operation

A .very Good B. Good C. Normal D. Not up to the expected level



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3. Training Menu Operation lib.mrt.ac.lk

A .very Good B. Good C. Normal D. Not up to the expected level

4. Resource Person Menu Operation

A .very Good B. Good C. Normal D. Not up to the expected level

5. Participants Menu Operation

A .very Good B. Good C. Normal D. Not up to the expected level

6. Performance Menu Operation

A .very Good B. Good C. Normal D. Not up to the expected level

7. Reports Menu Operation

A .very Good B. Good C. Normal D. Not up to the expected level

8. Help Menu Operation

A .very Good B. Good C. Normal D. Not up to the expected level



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7.1 System Appraisal Results

	Responses % out of a sample of 10				
	A Very Good	B Good	C Normal	D Not up to the expected level	Total
Overall assessment					
1.User friendliness	0.0	30.0	70.0	0.0	100.0
2. Speed	70.0	20.0	10.0	0.0	100.0
3.Appearance	20.0	60.0	20.0	0.0	100.0
4. Security	40.0	60.0	0.0	0.0	100.0
Functionalities of menu items					
1.Login	10.0	60.0	30.0	0.0	100.0
2.Course	0.0	80.0	20.0	0.0	100.0
3.Resource person	0.0	60.0	40.0	0.0	100.0

4.Participants	10.0	70.0	20.0	0.0	100.0
5.Performance	20.0	60.0	20.0	0.0	100.0
6.Reports	40.0	50.0	10.0	0.0	100.0
7.Help menu	0.0	30.0	70.0	0.0	100.0

Table 1: Training Management System – Assessment values in percentage for User type standard

Overall assessment	Responses % out of a sample of 10				
	A Very Good	B Good	C Normal	D Not up to the expected level	Total
1.User friendliness	0.0	30.0	70.0	0.0	100.0
2. Speed	70.0	20.0	10.0	0.0	100.0
3.Appearance	20.0	60.0	20.0	0.0	100.0
4. Security	40.0	60.0	0.0	0.0	100.0
Functionalities of menu items					
1.Login	10.0	60.0	30.0	0.0	100.0
2.Course	0.0	80.0	20.0	0.0	100.0
3.Resource person	0.0	60.0	40.0	0.0	100.0
4.Participants	10.0	70.0	20.0	0.0	100.0
5.Performance	20.0	60.0	20.0	0.0	100.0
6.Reports	40.0	50.0	10.0	0.0	100.0
7.Help menu	0.0	30.0	70.0	0.0	100.0

Table 2: Training Management System – Assessment values in percentage for User type Guest

SOFTWARE INSTALLATION GUIDE

This system can be installed in one method. To install the system on windows platform, you can use Installing XAMPP on Windows or Linux platforms then Web Based CMS Installer. In this installation, system will be installed on to the active partition of the system (C:\>). All other platforms it is needed to install manually.

8.1 Installing Program on Manual

Note: This installation program work in Windows and Linux environment.

For this manual installation, Apache, MYSQL and PHP installation should be completed before install the TMS system.

Copy “my web” folder of the given CD to document root of apache server.

Write click on copied my web folder and select properties and disable read only option.



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Copy all sub folders of Datadb folder of your MYSQL data folder. Default data folder name is data in windows platform. Open php.ini file with notepad. This is in window System 32 or WINNT folder. This depends on the type of windows configuration and version.

Find the location of SMTP = Localhost and replace Localhost with IP address of relevant SMTP mail server.

Find the location of “Keep send mail from” and delete it.

Restart Apache server and load “index .html” file at myweb folder.

Depends on the type of windows configuration and version.

To open the page of TMS, whenever you want, type in the address bar of your browser: <http://localhost/tms/index.php> or <http://localhost/tms/adminlogin.php>

USER MANUAL

9.1 Training management system overview

9.1.1 How to open Training Management System:

After installation complete, you can open TMS home page by typing relevant URL in any Internet Browser such as Internet Explorer or Firefox. Home page file name is index.html, which is at the my web sub folder of your apache document root.

URL as an Example: `http://localhost/xampp/` in a apache web sever their address is “`http: // localhost/tms`”

9.1.2 This web based Training System is most suitable for Intranet environment.



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- ✓ record participant applications on course number and name
- ✓ prepare course timetable and assign lecturers for course session
- ✓ prepare selection letters to inform participants to attend course
- ✓ invite resource persons to conduct course session
- ✓ record participants assessment information such as examination results, assignment marks etc.
- ✓ prepare course certificate and attendance certificates
- ✓ extract course statistics

Note : This user guide assumes that the reader has a basic grasp of how to use a personal computer. Refer to the manuals supplied with your computer system for basic information on using the computer.

Details of each menu given below.

9.2 Login

9.2.1 Login

System access is given only to registered users. To obtain valid user ID and password Please contact Administrator

Administrator user Id : administrator

Password : password

After installation, it is needed to create another user Id with administrator privileges. This Administrator account password can be changed accessing through this new user Id.

9.2.2 Sign UP

System access is given only to System Administrator. Hence for creating user accounts, it is needed Administrator level access permission.

9.2.3 Change Password

Administrator or any user who have administrator level access can changed user passwords by using change password menu item which is available in Login menu.

9.2.4 Remove user account

Administrator should do that using SQL commands. System does not facilitate for this process.

9.3 Module

9.3.1 Create a Module

This menu allows creating a module. Once you create a module course using create course menu, system will allows you to create timetable. For security reason, it is necessary to create timetable by the user who created the course (Course owner)

Course Number Format : yyyy Course Number

Ex. Course Number (Module No. 3990)

9.3.2 Select Participants for the course

“Add Participants” menu item allow adding participants to the course. However it is necessary to add participant details to participant database using “participants” menu.

9.3.3 List Course

Using “List Course” user can view course details.

9.3.4 List participants

By submitting the course number, user can view selected participants for the relevant course.

9.3.5 View Timetable

By submitting the course number, user can view course timetable

9.4 Participants

9.4.1 Entering of Participants Data

Participants data should be entered using “Participant” menu item. Organizations and their codes should be entered before entering the participant's data.



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9.4.2 Entering organizational data

Organizations should be fed using “Organization” menu item. It is recommended to use pre prepared coding system to track organization with in database.

9.4.3 Find an organization or list of organizations and their codes

Use “Find organization” menu item. Organization name or first few letters of Organization name can be used for searching.

9.4.5 Performance

This menu allows recording participant performance information such as examination results.

9.4.6 Examination details

Use “Examination “ menu item to create examination with their numbers names and subjects. It is recommended to use course name as examination number.

9.4.7 Examination Marks

Use “ Results” menu item to enter Examination marks. It is necessary to feed candidate index numbers before activating this menu.

9.4.8 Candidate information

Use “Candidate” menu item to feed candidate index numbers.

9.4.9 Assignment details

Use “Assignment” menu item to create assignment details including assignment number, subject etc.

9.4.10 Assignment Marks

Use “Results” menu item to enter assignment marks

9.4.11 Participant attendance

Use “Attendance” menu item to enter participant attendance. You can enter total individual attendance of candidates.

9.5 Reports

This menu provides facilities for Report preparation and printing.



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9.5.1 Viewing and printing attendance report

Use “Attendance “ menu item. Use print menu item from file menu for printing reports.

9.5.2 Viewing eligible candidates for awarding course certificates

Use “Certificates” menu item for this purpose. You can enforce one or more rules to check eligibility of participants.

Examination Results : Pass mark adjustable. Default is 40%

Assignment marks:

Take assignments marks considering as total marks out of 100

Attendance : Default is 80% . But it is adjustable.

Certificate generation facility is restricted only for the user who creates the examination.

9.5.3 Viewing examination results

Use “view Exam Results “ menu item

9.5.4 Printing Of course certificates

Use “ Print Certificate” menu item. It is needed to submit course number and select certificate type before proceeds operation. Set rules using “Certificates” menu item before start the “print certificate” menu.

9.5.5 Viewing list of courses participated by a given participant

Use “Training History “ menu item for this purpose. System searches all the courses participated by the participants after giving his National Identity card number.

9.5.6 Querying using SQL/MYSql commands

Using “Create query “menu administrator can run SQL/MySQL queries to extract information from the system.

9.6 Resource Person

This menu allows operating resource person details including data entry and manipulation.



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9.6.1 Feeding of resource personal details

Personal details can be entered using “Personal” menu item. Relevant Educational qualifications and preferred teaching areas should be entered through “Education” menu item.

9.6.2 Removing capable areas for training and qualified areas.

When you click mouse at Subject course text box in capable areas for training , it will list all existing details. Highlight the required text line and click relevant “Remove” button.

9.6.3 Professional Qualification

Professional qualification should be entered through “Professional” menu item. Subject details should be entered before operating the “Education” menu item.

9.6.4 Viewing details of a selected Resource Person

To view details of a selected resource person, enter relevant Nic No. (National Identify card number) using “View Res. Person” menu item.

9.6.5 Entering of Subject codes and subjects

Use “Subjects” menu item. It is necessary to use coding system to detect subject under various main categories. Ex. Information technology is a main category and Internet programming is a sub category coming under IT.

9.6.6 View Entered Subject List

Use” List Subject “ menu item.

9.6.7 Find suitable resource personals for selected subject

Use “Find Res. Person” menu item for this purpose . You should enter first few letters of subject name to find resources persons for the relevant subject.



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APPENDIX A: FOUR - WEEKLY CONTINUOUS ASSESSMENT REPORT SHEET


(To be submitted after every four weeks to the Training Division. A total of 6 reports are expected by the end of training)

Refer also page 6 of Training Handbook

1. Name of Undergraduate (as appearing in the Undergraduate Register at the University)											
2. Undergraduate Registration No.												
3. Address during training											
Tel. No. & Email address	0										@.....
4. Field of Specialisation ⁽¹⁾	CH	CE	CS	EE	EN	M T	M E	ER	TT	TL		
5. Training Stage ⁽¹⁾	Level 3 / 4 / Repeat											
6. Overall Training Period	From						To					
7. Name of Establishment											
Address											
Name of Supervisor											
	Tel. No. 0											
8. Report for four (4) week period (Week # 1 To 24)	From						To					
	Week #			Week #								
9. Supervisor's Assessment on Undergraduates												
9.1 Knowledge & Skills Development ⁽¹⁾	Excellent	Good	Satisfactory	Poor								
9.2 Compliance with Company rules & standards ⁽¹⁾	Excellent	Good	Satisfactory	Poor								
9.3 Communication & Integration with Company Staff ⁽¹⁾	Excellent	Good	Satisfactory	Poor								
9.4 Days of leave during 4 week period	Authorised		Unauthorised									
9.5 Comments by Engineer / Officer In-charge of Undergraduate												

9.6 Signature, Name and Official Seal of Engineer / Officer in charge of Undergraduate	
---	--


**APPENDIX B: SUPERVISION REPORT ON UNDERGRADUATE
TRAINEE UNDERGOING INDUSTRIAL
TRAINING**

01. Name of Undergraduate (Please write the Surname in the left cage and Initials in the right cage)												
02. Field of Specialisation ⁽¹⁾		CH	C	CS	EE	EN	M	ME	E	TT	TL	
03. Training Establishment												
04. Place of Training												
05. Undergraduate's attendance on the day of supervision ⁽¹⁾		Present/Absent/ Site Work					If Absent					
							Authorised			Unauthorised		
06.  Degree of satisfaction of Undergraduate on Training received		Comments										
06.1	Degree of satisfaction of Undergraduate on Training received											
06.2	Initiative to acquire knowledge & Skills											
06.3	Demonstrated abilities to contribute towards Industry											
06.4	Projects assigned											
06.5	Association with Company Staff & participation in Social activities											
07. Diary												
07.1	Availability of Diary for inspection ⁽¹⁾	Available					Not Available					
07.2	Entries made are ⁽¹⁾	Up to date					Not up to date					
07.3	Quality of notes made in the Diary ⁽¹⁾	Very Good		Good		Fair		Poor				

07.4	Quality of sketches diagrams and figures drawn in the Diary ⁽¹⁾	Very Good	Good	Fair	Poor
07.5	Undergraduate's knowledge about the entries made ⁽¹⁾	Very Good	Good	Fair	Poor

APPENDIX C: METHOD OF ASSESSMENT OF TRAINEES BY TRAINING DIVISION

1. General

1.1 Name of the Undergraduate											
1.2 Undergraduate Registration Number											
1.3 Field of Specialization	CH	C E	C S	E E	EN	MT	M E	E R	T T	TL	
1.4 Training Stage	Level 3			Level 4			Repeat				
1.5 Place of Training											
1.6 Name of Training Establishment	 University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations www.lib.mrt.ac.lk										
1.7 Location											
1.8 Areas of exposure during training										

2. Training Diary & Four Weekly Continuous Assessment Report (Total of 30 marks)

Comments made on the Undergraduate's performance by:
--

2.1 The officers of the Training Establishment	
2.2 The staff member of the University / the officer of the NAITA, supervising training	
Assessment of the content of the Training Diary and Four-Weekly Continuous Assessment Reports	
2.3 Quality of records and entries	
	Marks

APPENDIX D: APPLICATION FOR A TRAINING CERTIFICATE

Name of Applicant (Mr./Miss./Mrs.) :

--	--	--	--	--	--	--

.....

.....

Undergraduate Registration Number :



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Field of Specialisation

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CH	CE	CS	EE	EN	MT	ME	ER	TT	TL

Postal Address :

.....

.....

.....

.....

.....

Details of Industrial Training :

Establishment	Period	
	From	To

			/		/						/		/			
			/		/						/		/			
			/		/						/		/			
			/		/						/		/			



I certify that the information furnished above is true and accurate.

APPENDIX E: LEAVE ADVICE FORM

(To be sent by registered post to Industrial Training Division, University of Moratuwa when leave in excess of one week is to be taken)

1. Name of Undergraduate :

2. (a) Training Stage ⁽¹⁾ : Level 3 / 4 / Repeat

(b) Field  

CH	GE	CS	EE	EN	MT	ME	ER	TT	TL
----	----	----	----	----	----	----	----	----	----

3. Establishment attached to :

4. Exact place of work :

3. Leave already taken during current training period :

4. Leave now applied for from the establishment ⁽¹⁾ :

Leave Casual Sick

/ /

From

/ /

To

5. Has the leave been granted by the Establishment ⁽¹⁾ YES NO

(1) – Delete what is not applicable

/ /

.....

Date

(Signature of Undergraduate)

3. This form should be perfected and sent by registered post to the Industrial Training Division on applying for leave from the Training Establishment. For applying such leave the Undergraduate should use the standard forms available with the Training Establishment.
2. This form is solely for the information of the University Staff who are expected to visit the Training Establishments for training inspections. It does not replace the standard leave application form and procedures of the Training Establishment to which the Undergraduate needs to adhere.

**APPENDIX F: SUPERVISION REPORT ON UNDERGRADUATE
TRAINEE UNDERGOING INDUSTRIAL
TRAINING**

01. Name of Undergraduate (Please write the Surname in the left cage and Initials in the right cage)		University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations www.lib.mrt.ac.lk									
02. Field of Specialisation		CH		CS	EE	EN	M	ME	E	TT	TL
03. Training Establishment											
05. Place of Training											
05. Undergraduate's attendance on the day of supervision ⁽¹⁾		Present/Absent/ Site Work		If Absent							
				Authorised				Unauthorised			
06.		Comments									
06. 1	Degree of satisfaction of Undergraduate on Training received										
06. 2	Initiative to acquire knowledge & Skills										
06. 3	Demonstrated abilities to contribute towards Industry										
06. 4	Projects assigned										
06. 5	Association with Company Staff & participation in Social activities										

07. Diary					
07.1	Availability of Diary for inspection ⁽¹⁾	Available		Not Available	
07.2	Entries made are ⁽¹⁾	Up to date		Not up to date	
07.3	Quality of notes made in the Diary ⁽¹⁾	Very Good	Good	Fair	Poor
07.4	Quality of sketches diagrams and figures drawn in the Diary ⁽¹⁾	Very Good	Good	Fair	Poor
07.5	Undergraduate's knowledge about the entries made ⁽¹⁾	Very Good	Good	Fair	Poor
(Yes/No)					
08. Has the trainee read the Training guidelines & understood contents (Objectives, 4 weekly Report, Final Report etc.)					

Annex F. (Contd.)

9. Opinion of the Training Officer of the Establishment on					
9.1	Undergraduate's ability to benefit ⁽¹⁾	Very Good	Good	Fair	Poor
9.2	Industrial Training Programme in general & its usefulness to Industry ⁽¹⁾	Very Good	Good	Fair	Poor
10. Any specific problems faced by Training Officer or Trainee. ⁽²⁾					
11. Coverage of the relevant Training Standard or relevance to field of specialisation ⁽¹⁾			Sufficient	Insufficient	

12. Any other observation ⁽²⁾											
13. Name of academic staff member supervising											
14. Signature of academic staff member supervising											
15. Date of supervision	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">/</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">/</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>			/				/			
		/				/					

(1) - Delete what is not applicable

(2) - Use a separate sheet of paper if space provided is not sufficient



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APPENDIX G: METHOD OF ASSESSMENT OF TRAINEES BY TRAINING DIVISION

2. General

1.1 Name of the Undergraduate										
1.2 Undergraduate Registration Number										
1.3 Field of Specialization	CH	C E	C S	E E	EN	MT	M E	E R	T T	TL
1.4 Training Stage	Level 3			Level 4			Repeat			
1.5 Place of Training										
1.6 Name of Training Establishment										
1.7 Location										
3.8 Areas of exposure during training	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>									



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4. Training Diary & Four Weekly Continuous Assessment Report (Total of 30 marks)

Comments made on the Undergraduate's performance by:	
2.3 The officers of the Training Establishment	
2.4 The staff member of the University / the officer of the NAITA, supervising training	
Assessment of the content of the Training Diary and Four-Weekly Continuous Assessment Reports	
2.3 Quality of records and entries	


Annex G. (Contd.)

3. Training Report (Total of 30 marks)

3.1 Areas Covered
3.2 Relevance to training received	
3.3 Academic Features	Excellent Very Good Good Fair Poor
3.3.1 Presentation ⁽¹⁾	
3.3.2 Foreword / Acknowledgements ⁽¹⁾	
3.3.3 Contents ⁽¹⁾	
3.3.4 References / Bibliography ⁽¹⁾	
3.3.5 Chapter / Section / Subsection planning ⁽¹⁾	
3.3.6 Graphical, Tabular and other illustrative presentations ⁽¹⁾	
3.3.7 Appendices / Annexes ⁽¹⁾	
3.3.8 Analytical and Evaluative features ⁽¹⁾	
3.3.9 Any other (Please state) ⁽¹⁾	
Marks	

Annex G. (Contd.)

4. Interview (Total of 40 Marks)

	Excellent	Very Good	Good	Fair	Poor
4.1 General knowledge about the Training Establishment ⁽¹⁾					
4.2 Appreciation and understanding of the principles learnt ⁽¹⁾					
4.3 General knowledge about areas such as, Administrative and office practices, Financial procedures, Safety requirements, Interpersonal relationships, Inventory Management, Quality Management, Operational Techniques ⁽¹⁾					
4.4 Any Other (Please State) ⁽¹⁾					
 University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations www.lib.mrt.ac.lk				Marks	

5. Assessed by

Name		
Designation	Signature	

6. Date

		/			/			
--	--	---	--	--	---	--	--	--

(1) Indicate your rating by ticking the appropriate cage.



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